

SOLVING EMPLOYMENT: RESPONSES TO AUTOMATION

SOLUTIONS PAPER

SUMMARY

Breakthroughs in artificial intelligence (AI), connectivity and robotics have put the future of work in question and created considerable insecurity. Will there be enough jobs to go round? Will inequality increase? Geneva Macro Labs brought together members of Geneva-based international organisations to examine how to respond to these challenges. Based on those discussions, we see eight sets of solutions:

Rethinking work and the quest for meaning. From education to the economy, our entire societal system has evolved to facilitate making remunerated work the centre of life. However, this could come into question, with the entire nature of ‘a job’ being redefined. Solutions could include recognising currently unpaid activities as worthy of remuneration and social status.

Evolution of education systems. Accelerated technological change means education systems need to adapt, so that people can keep up with rapid changes in the jobs market. This could mean more emphasis on core skills (especially in science, technology, engineering and maths), competency-based education, and lifelong learning.

Transforming welfare and social safety nets. Robust safety nets will be required to ease adjustment to technological change—but existing systems are likely to be overwhelmed. New solutions could involve: de-linking social protection from employment status; a universal basic income; new forms of taxation (such as taxes on robots); and a greater responsibility for the private sector in providing social security.

Harnessing digital for job creation—in partnership with the private sector. Policy debates have tended to focus on job destruction, but the productivity gains from technology could be harnessed to spur job creation. New ‘digital jobs’ could emerge, especially in services. Tax benefits and other incentives could be used to encourage companies to invest in human capital.

New development routes for emerging economies. Automation looks set to close off the traditional development route for developing countries, based on exploiting lower labour costs. New routes could embrace the opportunities of technology, leading to ‘leapfrogging’ and technological transfers from South to North.

Sharing the technological dividend. The automation revolution is concentrating vast revenue and influence in the hands of a few tech companies. Policies will be needed to ensure that no single individual or company gains too much power, and to see that the dividends of automation are fairly distributed.

Strengthening international co-ordination. For challenges of global scale, the most effective solutions are based on global governance. New international bodies could help to tackle issues such as effective taxation. The upheaval created by automation could even be an opportunity to rethink the roles of states and international organisations, and their division of responsibilities.

Researching unknowns. It is far from clear what should be done to respond to the issues raised by automation, or how the response can best be coordinated. Research is needed into many areas, including what kind of skills will be crucial and how to optimise the job creation process.

Background to the solutions

Geneva Macro Labs aims to raise awareness, foster co-operation and communication, and improve policy-making around global priorities.

To test the potential for local leverage and gauge general interest in the ideas behind the GeM Labs, we held an event on the subject of this paper in June 2017, at the World Meteorological Organization, attended by 38 people from the international community in and around Geneva. ILO economist Irmgard Nübler gave an introductory talk that provided a broad overview of automation and its implications. Groups then discussed various themes: “Inequality and Skills”; “Job loss and supporting transitions”; “Development potential for emerging countries”; and “Smart governance and international coordination”. In the following months, we hosted “Global Policy Afterwork” events to refine the ideas with interested individuals. This paper is the result of that process.

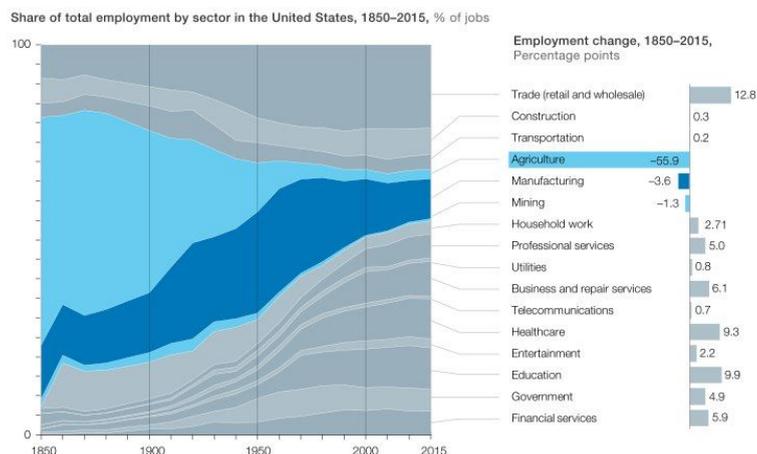
What are the issues?

Employment is under threat

In the past, automation and mechanisation mostly affected the manufacturing sector – for instance robots painting cars and machines canning foods. On the one hand, machines boosted productivity and relieved workers from many tedious and sometimes dangerous tasks. On the other hand, they contributed to the hollowing out of manufacturing employment. New advances in automation are now set to bring major changes to almost all professions, including service sectors. Improvements in AI and falls in computing and storage costs mean that many tasks performed by accountants, lawyers, medical doctors and other high-skilled occupations will be taken over by computers¹. A recent McKinsey study suggested up to 800m jobs globally could be lost to automation by 2030² (against a global workforce total of around 3.5bn in 2017).

The implications for employment are subject to debate³. It is possible that job losses could be so widespread as to bring the whole idea of employment as the norm into question. Machines may be able to take on so many tasks that many people will not be required to work at all. This raises serious questions for the entire economy. If there is mass joblessness, what are the implications for consumption, for example? History suggests though that new types of jobs—some of which are inconceivable at present—will emerge to replace many of the jobs that are destroyed.

History shows that technology has created large employment and sector shifts but also creates new jobs.



Source: IPUMS USA 2017; US Bureau of Labor Statistics; McKinsey Global Institute analysis.

¹ Susskind, R, and D Susskind, *The future of the professions: How technology will transform the work of human experts*, Oxford University Press, 2015.

² McKinsey Global Institute, *Jobs lost, jobs gained: Workforce transitions in a time of automation*, November 2017.

³ Arntz, M, T Gregory, and U Zierahn, “The risk of automation for jobs in OECD countries; A comparative analysis,” OECD social, employment, and migration working paper, May 2016.

However, the effect on wages also needs to be considered. So far, the new wave of automation has not led to higher productivity and incomes, at least not for the majority of people⁴. This round of technological improvements may be “zero-sum”, with advances in one sector offset by reverses in others. Such as when internet shopping (high productivity) leads to more demand for delivery services (low productivity).

Moreover, many of the new jobs that emerge may be more insecure than those they replace.

Technology is contributing to the rise of the ‘gig economy’ (temporary contracts and freelance work); the gig economy accounted for 16% of US employment in 2015, up from 9% a decade earlier⁵. Many people have to work more than one job to make ends meet. And there is likely to be a move towards more self-employment, across all sectors.

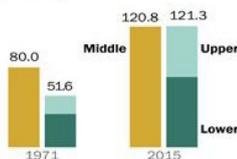
*“We will have to either change our objectives as a society or change the definition of a job.”
- Seminar participant*

Inequality is on the rise

The middle class is losing ground

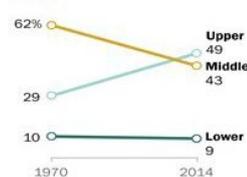
Middle-income Americans are no longer in the majority ...

Adult population by income tier (millions)



... and share of aggregate income held by middle-income households has plunged

% of U.S. aggregate household income



Note: The assignment to income tiers is based on size-adjusted household incomes in the year prior to the survey year. Shares may not add to 100% due to rounding.

Source: Pew Research Center analysis of the Current Population Survey, Annual Social and Economic Supplements, 1971 and 2015

PEW RESEARCH CENTER

Perhaps the most far-reaching changes will be in terms of inequality⁶. The gap between high- and low-income earners in developed economies has already increased in recent decades. With a fall in middle-class jobs and a shift towards both higher and lower-skilled employment, job polarization has worsened, too⁷.

And there is more to come⁸⁹. In contrast to previous waves of technological advancement, the current wave of innovation is digital, which means it takes very few people to generate enormous revenues. For instance, Google is currently worth as much as WalMart, but has 97% fewer employees. The digital nature of their products and services is what has made Apple, Google, Facebook and Microsoft the most valued companies in the world, replacing former industrial champions. A high concentration of revenues, with the gains from the technological revolution accruing overwhelmingly to the owners of technology, threatens to deepen and entrench inequality, and global regulation is playing catch-up.

Inequality is an issue in and of itself. High inequality undermines the cohesion of communities, societies and nations. It is also an issue for the economy more broadly, and for the future of employment. As middle-income households lose their jobs and swell the ranks of the less well-off, their consumption will fall. This so-called multiplier effect can be very large, leading to depressed cities and communities. Troubled cities, such as Detroit, may be

⁴ IMF, “Recent wage dynamics in advanced economies: Drivers and implications,” in IMF World Economic Outlook: Seeking sustainable growth, October 2017.

⁵ Katz, L F, and A B Krueger, “The Rise and Nature of Alternative Work Arrangements in the United States, 1995-2015”, NBER Working Paper 22667, September 2016.

⁶ Boushey H, J B DeLong, and M Steinbaum, eds, After Piketty: The agenda for economics and inequality, Harvard University Press, May 2017.

⁷ Pew Research Center, The American middle class is losing ground, December 2015.

⁸ Acemoglu, D, and P Restrepo, “The race between machine and man: Implications of technology for growth, factor shares, and employment,” NBER working paper 22252, June 2017.

⁹ Bessen, J, How computer automation affects occupations: Technology, jobs, and skills, Boston University School of Law, law and economics research paper number 15-49, 2016.

a harbinger of wider problems when more and more well-paying jobs disappear, not just in the car industry but across the economy¹⁰.

Catch-up is in question

Inequality is not only increasing within societies and countries. The digital revolution and automation are likely to worsen global inequality as well. In the past two decades, leading developing countries managed to catch up with more advanced economies by benefitting from the “global division of labour”, using cheap labour to produce goods for richer countries. This hurt the less educated in countries like the US, France or Germany, but helped their poor cousins in the South to improve their standard of living. “Stitches to riches” as one World Bank report has put it¹¹.

However, labour cost is no longer the only consideration for multinationals, as fewer and fewer workers are needed even for more sophisticated products than textiles and shoes. The new automation revolution is likely to put an end to this development model, threatening progress on reducing global inequality¹².

What needs to be tackled?

Managing these changes looks daunting. Enthusiasm about the potential of new technologies is not universal, especially if the job losses they bring are not properly compensated, particularly among those who are more advanced in their careers.

What needs to be tackled to address the issues raised by the new wave of technological advancement and avoid the more gloomy implications? There are perhaps three key areas of focus.

Education and re-training

The answer given to the challenges of AI and automation for employment is often “skills, skills, skills”. But not just any skills; maths and science will certainly be needed¹³. But it is increasingly clear that digital companies will be hiring relatively few people, so there will only be limited openings for all the engineers and software programmers currently making their way through university.

Other skills might be even more relevant. As computers take up the routine work, jobs for humans will, at least for a while, increasingly centre on creativity and personal interaction¹⁴. Soft skills, interpersonal communication and emotional intelligence will be in high demand¹⁵. Even in those occupations where the scientific content is high – such as for medical doctors – personal contact will dominate more and more in their daily routines, while AI like IBM’s Watson delivers the diagnosis.

“Redefining skills and work will drive different policies in education—which is essential for structural change.” - Seminar participant

But what about those who finished their education years ago? As people live longer, and spend longer in the workforce, they will increasingly need to learn new skills and even new professions to stay employable. A recent report by the World Economic Forum noted that “35% of the skills demanded for

¹⁰ Economic Innovation Group, Dynamism in retreat: Consequences for regions, markets, and workers, February 2017.

¹¹ World Bank, Stitches to Riches?: Apparel Employment, Trade, and Economic Development in South Asia, March 2016.

¹² Rodrik, D, “Premature deindustrialization,” Journal of Economic Growth, volume 21, number 1, 2016.

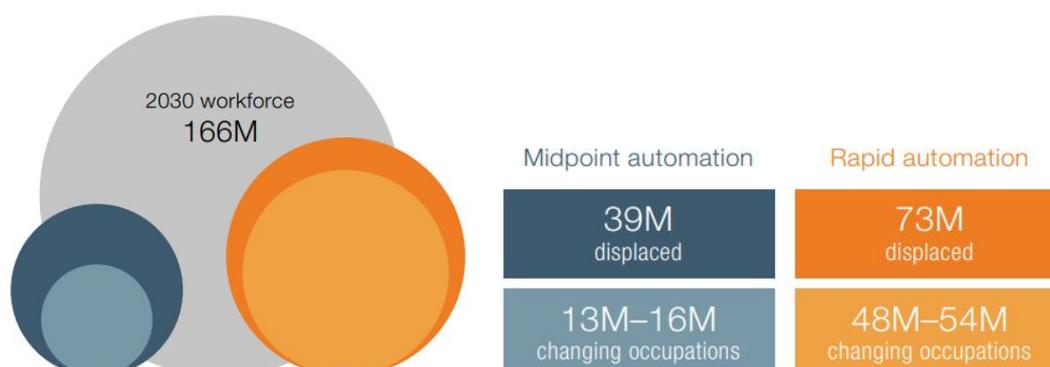
¹³ OECD, Getting Skills Right: Skills for Jobs Indicators, July 2017.

¹⁴ Autor, D H, “Why are there still so many jobs? The history and future of workplace automation,” Journal of Economic Perspectives, volume 29, number 3, summer 2015.

¹⁵ Bakhshi, H, et al., The Future of Skills: Employment in 2030, Pearson and Nesta, September 2017.

jobs across industries will change by 2020.”¹⁶ McKinsey have suggested that up to one-third of the US’s 2030 workforce may need to switch occupation groups as a consequence of automation¹⁷.

Number of workers displaced by automation, and those needing to change occupational categories (US)



Source: McKinsey Global Institute (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation

For the moment, the kind of lifelong learning required is more a dream than reality¹⁸. There are few institutions to support complete changes of career. Job loss may prompt drastic switches, but people typically tend to find new employment in the same sector. There will need to be more mobility across occupations and sectors in response to the technological revolution.

Unemployment support

For adjustment to take place on such a broad scale, social security systems need to change¹⁹. Taking up new professions is time-consuming. In most countries, the idea still is that unemployment periods should be kept as short as possible. Prioritising bringing people back into work and off public support is fine if job loss is related to temporary difficulties in the economy. But as technological change gathers pace, people will need more time and support to switch careers.

Besides proper training institutions that can allow people to change track even late in their careers, social safety needs to be provided to support such retraining. This is unlikely to be a task that can be achieved by the public sector alone. Today’s systems do not offer the kind of flexibility to, for example, provide incentives for saving into personal training accounts, or draw on pension earnings to pay for training in exchange for later retirement.

Capacity to act

Another issue that needs to be tackled is our capacity to act. The new wave of technological change increasingly threatens to undermine those institutions established to help us cope with the risks of life. Unemployment support, health insurance and pension systems all heavily rely on the fact that people have full-time, permanent jobs. But this may no longer be the norm. Moreover, increased concentration of corporate profits and the hollowing out of middle-class employment have negative implications for government revenue²⁰. There is a risk that these changes seriously undermine governments’ capacity to serve and protect their citizens.

¹⁶ World Economic Forum, Accelerating workforce reskilling for the fourth industrial revolution: An agenda for leaders to shape the future of education, gender and work, July 2017.

¹⁷ McKinsey Global Institute, Jobs lost, jobs gained: Workforce transitions in a time of automation, November 2017.

¹⁸ Nedelkoska, L, and G Quintini, Automation, skills use and training, OECD working paper, March 2018.

¹⁹ Taylor, M, Good work: The Taylor review of modern working practices, Report for the UK government, July 2017.

²⁰ UK Treasury, Corporate tax and the digital economy: position paper, November 2017.

Solutions: What has already been proposed?

Certain solutions to these challenges are already being considered and tested by policy-makers—Universal Basic Income (UBI) for example. Our discussions identified four broad themes, around education, welfare, job creation and development models.

Evolution of education systems

The constant change that comes with the current pace of technological progress means that education and training need to go beyond the traditional 12-15-years of high-school, professional and university studies²¹. Rather, education systems should help develop core skills necessary to make continual progress²². This would imply that:

- ❖ STEM (Science, Technology, Engineering and Maths) skills could be provided in schools from an early age, alongside an emphasis on critical as well as creative and systems thinking;
- ❖ New education structures could be developed to allow for adaptive and lifelong learning;
- ❖ Competency-based learning could replace purely skills-oriented education, with technical training to close gaps during the course of the working life.

Transforming welfare and social safety nets

Adjustment to technological change can be eased through safety nets providing social support and income replacement. However, the profound and disruptive changes that are in the offing are likely to overwhelm existing systems, so new solutions will be needed²³:

- ❖ Universal social protection is likely to remain important, but could be delinked from employment status. In particular, disadvantaged groups need to be targeted as a priority, in order to limit negative feedback loops like a potential further rise in populism;
- ❖ A UBI could guarantee a minimum income for everybody, but might have to be complemented with additional safety nets to account for individual circumstances. The advantages of such a universal system are that it is relatively easy to administer and provides a minimum income even for those who have most difficulty adapting to technological change. If automation does result in widespread job losses or greater pressure on wages, a UBI might be more effective than current social security safety nets;
- ❖ Current government revenues would not be sufficient to finance such extended protection systems, so additional resources would be needed. These could come from new taxes (for instance value-added taxation that included taxing robots, or an increase in consumption taxes).

“We won’t be able to save everyone with the current welfare state.” - Seminar participant

²¹ Holzer, H, Job market polarization and US worker skills: A tale of two middles, Brookings Institution, April 2015.

²² Dittrich, P J, Reskilling for the fourth industrial revolution. Formulating a European strategy, Jacques Delors Institut, November 2016.

²³ OECD, Basic income as a policy option: Can it add up? May 2017.

Harnessing digital for job creation—in partnership with the private sector

Policy debates arguably need to evolve away from limiting possible job destruction towards a focus on job creation by, e.g., capturing the productivity benefits of technology²⁴. This could help to create economic growth, surpluses, and demand for work that ultimately benefit everyone. Solutions could involve accelerating job creation in general through stimulating investment in businesses, and the creation of ‘digital jobs’ and digitally enabled opportunities to earn income in particular (from, for instance, ‘virtual reality content editors’ to ‘chief experience officers’).

This could be supported by new forms of public-private partnership²⁵. Investment in digital infrastructure, for instance, would unlock the benefits of technological advancement. Tax deductions could be extended to encourage philanthropic ventures (e.g. the Gates Foundation). Through tax benefits and other incentives, policy-makers can encourage companies to invest in human capital, including job creation, learning and capability building, and wage growth. Companies face gaps in the skills they need in a more technology-enabled workplace. They could benefit from playing a more active role in education, including providing better information about needs to learners and teaching institutions and creating better learning opportunities.

New development routes for emerging economies

As the traditional development route from agriculture to manufacturing to services seems set to become increasingly difficult for those countries that are still catching up, alternative ways may have to be found to jump-start their development²⁶.

- ❖ Policies could focus on ‘leapfrogging’ (moving straight to technologically advanced systems, such as skipping the need to update fixed-line telephone infrastructure by moving straight to wireless, overtaking advanced economies in that process) and of technological transfers from South to North. For instance, the Kenyan e-banking system M-Pesa, developed in 2007, is now spreading to other low- and middle-income countries, including in Eastern Europe. Digital services are particularly well suited for such leapfrogging possibilities, as they require little capital and offer significant gains from servicing advanced economies.
- ❖ Additional policy initiatives are also required, if global wealth is to spread more evenly. In particular, global redistribution, for instance through managed international migration, could help create win-win situations for both advanced and developing countries. However, that would require adjustments both to the way immigrants are integrated in advanced economies and to how their wages spur development through remittances.

“Global redistribution is hard to achieve. But it might help to spur a new type of governance.” - Seminar participant

²⁴ Brynjolfsson, E, and A McAfee, Machine, platform, crowd: Harnessing our digital future, W. W. Norton & Company, 2017.

²⁵ Burkhardt, R, and C Bradford, Addressing the accelerating labor market dislocation from digitization, Brookings Institution, March 2017.

²⁶ Hallward-Driemeier, M, and G Nayyar, Trouble in the making? The future of manufacturing-led development, World Bank Group, September 2017.

Solutions: What more could be needed?

The kind of solutions currently under discussion in the public domain could do a great deal to mitigate the impact of the technological revolution on employment. However, it is questionable whether they go far enough, and there are important gaps. We have identified a further four areas where the policy debate has been far more limited, but which could prove highly important in the search for employment solutions, around the very idea of work, the technological dividend, international co-ordination, and researching unknowns. In general, it is important to make policies to respond to changes in employment proactively rather than reactively.

Rethinking work and the quest for meaning

Most people structure their lives around work. It gives them a purpose and a means to contribute to society at large. From education to the economy, our entire social system has evolved to facilitate making remunerated work the centre of life. Employment is the foundation not just of the economy but of our very existence. However, this could come into question.

Decoupling employment and purpose is imaginable. If people want to find meaning in a society where employment is less necessary, we may need to rethink our concept of a “job”. This could mean recognising currently unpaid activities such as care for family members as a source of meaning and an important contribution to society at large, worthy of remuneration and social status.

Sharing the technological dividend

The automation revolution is concentrating vast revenue and influence in the hands of a few tech companies. Policies will be needed to ensure that no single individual or company gains too much power, and to see that the dividends of the automation are fairly distributed. Some antitrust moves are already under way, notably in the EU, but more radical solutions could be required. One idea we discussed is that, rather than treating the data we produce through our online interactions as capital in the ownership of corporations, it should be treated as a product of labour, with the creation of a market in data that would pay people for the data they generate²⁷.

Strengthening international co-ordination

Issues of global scale demand global governance. This will be difficult to achieve, but the sooner we experiment with possible approaches, the sooner we will find out how to improve global co-ordination.

The coming wave of international challenges might even cause enough of upheaval to create an opportunity to reshape mindsets, redefining what a nation is and what the division of responsibilities should be between states and international bodies.

A new series of bodies specialised in different areas affected by the technological revolution may be needed to complement existing organisations. These could focus on broad, global issues such as education systems, R&D, healthcare, safety nets and tax systems..

“We need to rethink how we conceive of nations and about the responsibilities of nations and international bodies.” Seminar participant

²⁷ Ibarra, A, et al., “Should We Treat Data as Labor? Moving Beyond ‘Free’”, American Economic Association Papers & Proceedings, Vol. 1, No. 1 (forthcoming), December 2017.

Researching unknowns

It is far from clear what should be done to respond to the employment challenge, or how it can be co-ordinated²⁸. There is a need for research into many areas: (i) jobs (or equivalents) in an automated society; (ii) which skills will stay in demand; (iii) regional idiosyncrasies and how to factor those into solutions; (iv) prioritisation research, to understand what to tackle first; (v) effective approaches.

“We don’t know what is going to happen, so it’s not clear what interventions we should make or how we will need to coordinate.” - Seminar participant.

It will be particularly important to understand the consequences of automation and how to optimise the job reinvention process. This could include (i) aligning economic incentives with public interest; (ii) changing our objective/identity as a society; (iii) changing the definition of a job.

²⁸ National Academies of Sciences, Engineering, and Medicine, Information technology and the US workforce: Where are we and where do we go from here? The National Academies Press, 2017.

Conclusion. What can we do?

At Geneva Macro Labs, we see five ways in which we and those who share our interest in advancing solutions to global issues can act—in relation to employment solutions, but also in general:

Further our understanding of what matters. Highlighting the radical implications of automation and AI for employment is critical to gain support for finding and implementing solutions that will prove valuable long-term, not only to society at large but to the individual constituting it.

Improve governance. This could involve advocating for existing social institutions to receive the resources and mandate to tackle the upcoming challenges, as well as pushing for alternative structures as needed, from the local to the international level.

Improve prediction and foresight. Work is needed to anticipate the impacts of future developments, and assess the potential of various approaches and solutions.

Reduce existential risk. To create a better future, there has to be a future. Understanding what risks we are facing as a civilisation at large and how to continue to try solving our societal issues is inevitably going to have to happen in parallel.

Increase the number of highly-skilled people working on global priorities. Through targeted education and engagement we can more reliably find and implement solutions.

How we can best act to improve policy-making and foster the implementation of effective solutions around global catastrophic risks will be the subject of further research and a key area of focus for Geneva Macro Labs.

Do you want to know more?

Visit Geneva Macro Labs online:



facebook.com/genevamacrolabs/



linkedin.com/company/geneva-macro-labs/

Read more on our future focus on global catastrophic risks:

[The Global Challenges Foundation Risk Handbook](#)

Read more on automation and employment:

[Harnessing automation for a future that works - McKinsey Global Institute](#)