

**AI, Automation and Labour: Projected Outcomes on the Basis of the
Current and Future Economic Climate**

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Abstract

Advancements in AI technology can provide many potential benefits to society, but there are also many risks associated with the introduction of such technology into the labour force, and it is important to fully explore these impacts automation can have on the lives of working people, as well as society as a whole. In this report, we examine the impact of AI within the domain of labour, looking specifically at political-economic theory, the response of the technology industry, and related policy-making around education and a universal basic income (UBI), examining both the opportunities that may result from automation as well as potential issues. We conclude that the societal outcomes for the impact of AI technology on the labour force are dependant on the economic system in which it is situated, and in our current free-market society, AI technology will ultimately lead to a more precarious situation for vulnerable workers, and society as a whole. In order for humanity to fully reap the benefits of automated labour, capitalism must be replaced by another, more equitable system where human need, not profit, is the underlying motive for the employment of automation in our workforce.

1 Introduction

In recent years, automation within the business realm has seen a lot of discussion, with some concluding that such developments will have a very positive effect on human society, while others believe it could lead to mass unemployment and poverty for everyone but those who own and control such technology. As most of the critical literature on this subject tends to skew in an entirely positive or negative direction, we will take a more holistic, materialist approach, examining both the perceived positives and negatives that could result from increased automation, particularly looking at political-economic theory and our current economic system, the responses of the technology industry, and related policy-making. In order to do this, this report explores the history of the development of AI within the workforce, examining previous writing done on this topic, and a critical reflection on the recent and forthcoming developments in automated labour, allowing us to be better able to critically examine the ideas that have been presented as

possible solutions to the issues associated with AI and labour, as well as suggest potential solutions of our own.

This report concludes that increased adoption of AI is inevitable, and if continued under the current economic system, minimal reforms will likely be explored to respond to the crises created through this change. Solutions such as changes to the education system, the introduction of the universal basic income (UBI), and new ways for AI to connect people with jobs are among the most discussed. However, they all fail to get to the root of the problem, where these potential solutions will only exacerbate them, creating more wealth and unaccountable power in the hands of the owners of such technology. For humanity to truly benefit from the mass adoption of AI in the workplace, we must create an economic system that addresses human need, where power is distributed among the people, rather than in the hands of the few for massive profit. To discuss this, we use texts by Marx, Marxist scholars, as well as analyse current and historical economic trends in the US, assessing the potential outcomes.

2 Domain of Choice

This report will discuss the domain of AI and automation of labour. Developments truly began with the revival of machine learning in computers in the 1980's, coupled with the advancements in computers in the workplace, but have taken off in recent times due to advancements in AI. While people overall work more hours since the introduction of computers in the workplace and we haven't seen a massive displacement of people in the workforce, major changes due to advancements in AI are predicted by economists, political scientists, technology companies, and others, though there are some outliers who disagree with this prospect. This report argues that this shift is coming, and is quite significant, as there is potential for working people to either be freed from many types of menial, semi-professional and professional work and lead better lives in sharing the wealth and benefits created by automation. Though, there is also potential for working people to be excluded from these benefits, with a high unemployment rate, and less value placed on human labour leading to overall worse working and living conditions. These potential outcomes though not entirely black and white, but are inherently dependent on who owns and controls of

the economic sphere, and how much working people are willing to fight for major reforms, or even for an entire transformation of our economic system to a more equitable one, in which unchecked economic power by the elite ceases to dictate how technology is employed in society.

3 Related Work

Future Projections

The majority of writing on the future of labour and AI argues that the vast majority of workers in North American society will be displaced, throwing society into upheaval. King, Hammond, and Harrington (2017) state that AI is beginning to reach levels where it is possible for such technology to learn and grow on its own, and predict that jobs with both routine and sophisticated skill sets will be threatened if such development continues. They argue that technological skills will likely be necessary in order to gain employment if AI is going to continue to see such sophisticated development. Going further, Munoz and Naqvi (2017) argue that people with technological skills and those with the capital to support them will likely come together to build highly sophisticated smart cities, causing everyone without funds or skills to have to migrate to non-smart, “De-tech,” cities due to a lack of jobs available, leading to a permanent separation between those living in smart city “utopias” and those in impoverished “De-tech” cities. While their predicted timeline seems far-fetched, stating this could occur within 20 years, their reasoning is quite solid and plausible that such an upheaval to society could occur if technological developments are left unchecked.

Some sources however take an opposite stance, arguing that rather than seeing a large decrease in labour due to automation, AI technology may not have as negative an impact as believed, and in some respects may actually lead to an increase in labour instead. Arntz, Gregory, and Zierahn (2017) argue that, if one considers the individual tasks people do at a job rather than at an occupational level, including problem solving and influencing, tasks machines cannot currently do as well as humans, only 9% of jobs are at a high risk of being replaced by machines, rather than the 38% others have reported. Their approach, based upon a more nuanced understanding of jobs rather than a broad view, makes their

conclusions seem believable, although it may be too hopeful to believe such skills make humans irreplaceable, based upon the AI developments noted in other sources. Further, Samothrakis (2018) argues that based upon the increase in working hours observed during past industrial revolutions, when new technologies began to take the place of human labour, the introduction of even more intelligent machines will likely lead to even more working hours, as humans will have to work longer and harder to compete for wages.

Labour Market: Impacts and Responses

The Brookfield Institute (2016) estimates that 42% of the Canadian labour force is at a high risk of job loss due to automation. The Canadian Occupation Projection System found that jobs with the lowest risk of automation tend to require high levels of education and tend to pay higher wages. This research was built upon the study Oxford researchers Carl Benedikt Frey and Michael A. Osborne conducted with US data. According to the Frey and Osborne study (2013), 47% of US employment is in a category at high risk of job loss due to automation. They estimate that this will potentially occur over the next one or two decades. Research shows that automation is likely to eliminate jobs within the next 10-20 years and that the jobs at highest risk of loss are in low-wage sectors. This means that low-wage workers are most vulnerable to job loss.

Despite this bleak prognosis, there are responses coming from government, non-profit, and industry attempting to curtail the negative impacts of AI and automation on labour, however small. A piece from the Stanford Center on Poverty and Inequality (2018) asserts that AI could be used to thwart impending job losses by simultaneously serving as a tool to match displaced workers with “good middle-class jobs that are going unfilled”. If AI could potentially predict where future job openings will be, it could also identify the training and skills necessary to fill them. There is also a possibility that AI could adapt to students’ individual learning styles and therefore train students based on their strengths while correcting their weaknesses. Lastly, the author suggests that AI could reduce and replace the role of government assistance in anti-poverty efforts.

Artificial Intelligence, Automation, and the Economy (2016), a report from the United States' Executive Office of the President, found that AI has limitations in areas that could open opportunity for human labour. These limitations include manual dexterity, generative intelligence, social and ethical engagement, and creativity. The report posits that economic response should focus on planning for transition into new and different roles for human labour. In some areas AI could augment human labour, in other areas humans will be needed to develop and supervise AI, and entirely new fields might arise in response to the changes AI brings. However, it also notes that these limitations and prospective growth areas could change in coming years as AI develops.

Industries developing AI technologies are pitching AI as both the cause of and solution to major economic changes that are likely to render masses of jobs redundant. IBM developed a campaign - Science for Social Good - that aligns with the United Nations' Sustainable Development Goals (2017). One associated project intends to use data mining for worker education and re-training. This is aligned with the Stanford Center on Poverty and Inequality (nonprofit) and the White House report (government), thus it may likely see a policy supported response.

Yet Brynjolfsson and McAfee (2014) warn that despite rising productivity, wages have declined. This indicates a bigger shift in the distribution of economic benefits. Instead of "everyone receiving at least some of the benefit, the vast majority of that value will go to a very small portion of the population." This will be further developed in the next section.

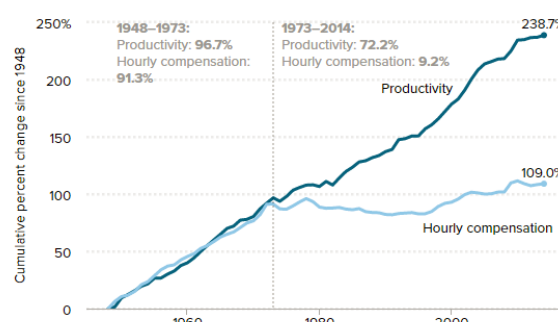
Economic context

To predict how this coming shift will impact workers and how technology is applied, an economic and materialist analysis must be used. A dialectical approach to technology, where the base of society, (economics) shapes the superstructure (supporting institutions, including science and technology) sheds light on how AI will impact the relationship that the public has with employment and how technology will be employed. In a free-market society, this relies on the profit motive, where Moore, Upchurch and Whittaker (2017) argue that economics will shape the

application of technology, where new products will not be made until a profit can be made. They further discuss that in capitalism, when these technologies become adopted, other companies must follow in order to stay competitive, creating mass adoption for increased profitability and the folding of business who cannot adapt. With this change, as discussed in Moore, Upchurch and Whittaker (2017) but first theorised by Marx in *The Grundrisse* (1973), the rate of exploitation of workers increases, where more technological progress lowers the demand for labour relative to capital. This paradoxically stagnates or even decreases wages, while simultaneously increasing productivity of remaining workers, and thus increasing their rate of exploitation. (Marx, 1973) This has been the trend since the 1970's, and it has only become more pronounced as automation in the workplace has increased. See Figure A (Economic Policy Institute) to visualize the large increase in worker productivity alongside stagnation of real wages in the US. It is clear that the increased wealth and prosperity due to automation has not materially benefited workers. That is, employers could easily afford higher wages, but did not pay them. Without major changes to the way wealth is distributed in society, it is likely that this trend will continue, seeing the benefits of increased automation through AI technology going to the elite.

FIGURE A

Disconnect between productivity and a typical worker's compensation, 1948–2014



Source: Economic Policy Institute (2015)

This is a compelling assessment of wage labour under capitalism, as expressed by the figures above. This chart expresses the current accuracy of this assessment, as it was in Marx's time, only the situation will be amplified based on future projections discussed earlier. Implementing this technology once the price point is overall profitable will lead to massive layoffs, in line with the tendency of capitalism to gravitate to cyclical

and more intense crises due to contradictory nature of the inability for people to buy goods and services due to practices enacted for business to stay competitive, such as wage depression, layoffs, reduced benefits, etc. This is the crux of the problem, where too much wealth will be concentrated in the owners of the machinery, and not enough wealth is being shared with those actually doing the labour.

Marx particularly discusses the impact and the possibilities of automation in *The Grundrisse*, where he states that when labour is automated it is no longer to be included in the process of production and the human becomes the overseer, rather than the worker. “As soon as labour in the direct form has ceased to be the great well-spring of wealth, labour time ceases and must cease to be its measure.” (Marx, 1973, n.p.). Though, that doesn’t mean there will no longer be work. In Artur (2015, 8), he quotes Bowen (1966, p.9) who correctly states that “technology eliminates jobs, not work”. However, as previously discussed, in the dialectical relationship between capital and the surrounding institutions, including labour and technology, work will not be done unless it is somehow profitable. Despite a high unemployment rate, reaching 10% officially (Bureau of Labour Statistics, 2018), and much higher unofficially since the 2008 crisis and the subsequent slow recovery, crumbling infrastructure in the US shows that there is still plenty of work. However, since this work is not necessarily profitable, there is little incentive for business or government to act. This is likely to continue as long as the current economic system remains in tact. Reforms are possible, however the cyclical crisis-driven nature of capitalism and the tendency for profit to concentrate into the hands of the owners, it is unforeseeable that reforms will be truly able to address the underlying cause of such economic problems.

In the chapter “Fragment on Machines” Pitts discusses Marx’s work of the same name, as well as several works informed by Marx’s chapter in the *Grundrisse*. This includes a discussion on Mason’s Postcapitalism (2015), Accelerationism by several authors such as (Mackay and Avanessian 2015; Srnicek and Williams 2015a; and Negri in 2015), and Fully Automated Luxury Communism (Bastanti, 2015), where the latter is now a major online movement among young people, particularly on social media. That is, they all use Marx’s chapter to discuss the prospects of

automation and genuinely free knowledge sharing in a post-capitalist society, in what Marx termed the general intellect (Marx, 1973). He theorized that with enough automation, labour time would eventually be reduced to a minimum and workers would become free to pursue science, art, and other self-developing and fulfilling endeavors (Marx, 706). But this can only occur within an economic system that has a base of collective ownership and profit ceases to be the underlying motive for technological development and application. Pitts asserts that “(Marx’s) The Fragment suggests we can let capitalism’s technological advancement unfold so as to break through the limits that stand between us and communism” (2017, 188). He aptly argues that current capitalist development of AI will be an important piece of which people use to build a more equitable society, creating the conditions that will lead to the post-capitalist society in which Marx’s general intellect can be achieved.

4 Critical Evaluation of Progress

From the progress outlined throughout the literature review, it becomes clear that job automation will have a significant effect on labour patterns, and the larger society as a result. The literature tends to show that jobs consisting of routine tasks, including the exchange of information, selling and the use of hands, are the most at risk, while those that are more based around interactive and cognitive tasks have less of a chance of being automated in the near future (Arntz et al., 2017). Based on this, about 39% of the population, a very large percentage, is believed to be at risk of losing their jobs to automation within two decades (Arntz et al., 2017). In order to avoid the effects of such mass unemployment, including poverty and the further monopolization of wealth, significant action will need to be taken. Current solutions suggest job retraining, wealth redistribution, and social programs such as Universal Basic Income (UBI), among others.

Indeed, the progress in this domain is bleak. AI-induced worker education and retraining sounds remarkably similar to previous economic forecasts, such as the green jobs trend that never was. In response to the 2007-2008 economic crisis, Canada and the United States promised the birth of a new industry of jobs, in preserving and restoring environmental quality, yet it never fully materialised. Now we have broad speculation

about the skilled jobs of the future but little discussion of the potential impact on the low-skilled workers who may be excluded from this transition.

Despite partnerships with nonprofit/nongovernmental organizations, the technology sector is astoundingly out of touch with the causes and effects of poverty. Without a trace of irony, they stage elaborate conferences where anti-poverty games are played, actual games, involving simulations of automated food delivery to the starving corners of the world (Global Festival of Ideas for Sustainable Development). While there may be potentially good results from these exercises, they appear to do little to strike at the source of poverty and inequality, capitalism, and they likely constitute a tremendous expense. Broadly, the value of the technology sector is overinflated, particularly since that value is measured by profit-margin rather than by ameliorating economic woes such as poverty and inequality.

Another approach involves research into alternative income and taxation models that would result in wider distribution of the wealth that these technologies are creating. Separating income from employment is the idea behind potential welfare reforms, such as Universal Basic Income, that are garnering support, notably from some Silicon Valley industry leaders. Others suggest that progressive robot taxes and luxury taxes could be used towards cushioning the transition to mass unemployment and a post-work world.

5 Reflections of Progress and Policy Suggestions

As it is almost inevitable at this point that automation will see more and more of an impact on labour, there will likely need to be great changes made in a variety of facets of today's society if we are to see a smooth transition into a society where a significant portion of the labour force is partially or fully automated.

A number of sources, including Oschinski and Wyonch (2017) and King et al. (2017), project that traditional skill areas will need to be adjusted in order to meet the new labour force demands, and believe that education centres will become one of the focuses for this change, creating programs that heavily focus on computing

and other skills that automated machines cannot foreseeably complete on their own. Therefore, it is advisable that schools at all levels, from elementary onward, focus on teaching skills that will be relevant for working alongside automated technologies, including not only computer science, but things such as critical thinking and interpersonal skills.

Additionally, if we are to avoid the scenario projected by Munoz and Naqvi (2017), in which automation technology advancements and its benefits are monopolized by a small few people, governmental interventions are going to be very necessary, as history has shown that such companies cannot be trusted to freely share their technological advancements or the resulting wealth. Munoz and Naqvi (2017) themselves suggest that governments should intervene by regulating how much of a monopoly over development a tech company can have, as well as ensuring developments are more widespread, perhaps preventing their predicted "smart cities" from occurring. It seems unlikely that governments on their own would intervene in such a manner however, and it may be that public education on these issues will have to happen before governments can be pressured to enact legislation. However, such interventions do not address the root of the problem, and lack any guarantees that they will last, as the history of the 20th century in North America shows that such benefits can easily be clawed back and inequality can continue to grow.

Universal basic income (UBI) is a radical solution to income inequality that first drew attention in the 1970's and fell off the radar, but has been making a comeback with attention from high-profile tech billionaires such as Bill Gates, Mark Zuckerberg and Elon Musk, among several others. Chris Hedges (2018, n.p.) provides an excellent critique of their motives, and sheds light on who exactly benefits from a UBI. He quotes David Harvey, saying "they know their technologies are putting people out of work by the millions and that those millions will not form a market for their products if they have no income.", just as Marx predicted. Their motives are clear, where they do not call for any structural change, nor do they not want "businesses and the marketplace regulated, labor unions... free college education, universal government health or adequate pensions. They seek, rather, a mechanism to continue to exploit desperate workers earning subsistence wages and whom they can hire and fire

at will.” (Hedges, 2018, n.p.). Hedges asserts that while they use empty moralist rhetoric to make their case, the conditions of workers in the global south in sweatshops and factories, and the hyper-exploitation of workers such as Uber drivers worldwide speak louder.

High-profile labour unions also oppose the UBI, such as the largest union in Finland, where UBI is currently being tested among a group of unemployed youth. The Central Organisation of Finnish Trade Unions (SAK), with close to 1 million members assert that UBI will only weaken the labour movement, and will become a disincentive to organize and to even work. (Tiessalo, 2017). While it’s the case that they are opposing in self-interest, their self-interest in line with their members to maintain the power to organize and achieve better working conditions. With a smaller membership their capacity to do so is diminished. As discussed previously, this is in the interest of large tech billionaires of Silicon Valley who vehemently oppose union organizing.

In fact, UBI is a reform scheme that does little to address the unchecked power that is inevitably tied to large sums of wealth amassed by the owners of technology used to automate labour. In politico-economic terms, it is another attempt at appeasing the public as a disincentive to reach the end goal of luxury automated communism as discussed earlier. Whether wealth is generated by humans or by robots, the unequal distribution of it results in mass poverty. We have already seen productivity grow while compensation has stagnated over the last half-century, which has directly resulted in wealth concentrating in a very small and very powerful population. Automation is set to exacerbate that, and a UBI is not a real plan to expressly redistribute wealth, but serves only to cut back social programs, create a precarious workforce, and guarantee a market for their products.

Labour-power as a commodity is a negotiation between the worker and the money owner. Without ownership of the means of production, a worker cannot sell any commodity other than labour-power. The value of that labour-power is determined by the labour-time necessary for production. (Marx, 120). So how does the value of work change when the little economic bargaining ability that people have, our labour and time, becomes useless? Who is responsible for correcting this economic shift in a system where regulation

and intervention are widely seen as antithetical to an inalienable right to unrestrained profit?

What happens if, like green jobs, new AI-related jobs never fully appear? What happens if AI-driven education and retraining are not matched with the quantity and quality of jobs needed? What happens if a Universal Basic Income proves inadequate to provide for “non-worker” needs, and simultaneously erodes existing social benefits, while also cutting corporate costs for labour? Public benefits continue to support massive individual and corporate wealth (i.e. tax benefits and industry subsidies), while workers are not granted allowances similar in scale, in either direct (e.g. monetary investments such as paid worker education and training) or indirect (e.g. tying wages to cost of living) forms. So the real question is, how can AI eliminate this fundamental inequality? This is an important question to further be explored in order to make the world more liveable for working people, and to move towards the fully automated luxury future that is possible with mass adoption of AI.

6 Conclusion

As current trends show, the future of AI in the workplace will exacerbate existing inequality, due to the tendency of concentration of wealth in the elite class in the current economic climate. As current projections indicate, this will cause the further devaluation of an already artificially depressed labour market. However, as Marx discussed in *The Grundrisse*, echoing his statement in *The Communist Manifesto*, that the elite class will create the conditions for their own destruction. That is, the inevitability of crisis and investment in automation to maximize profit, will lead to the demand for change by labourers as some will become increasingly excluded from the workforce, and others will see the profit extracted from their labour increase. History and present has shown that attempts to reform the system to alleviate these issues are often met with resistance from big business, with their vast amount of unchecked power, have a high amount of clout in which policies are enacted at a government level. Some of these solutions, such as the UBI and changes to education policy may be a step in the right direction, though without addressing the root cause of such inequalities, working people will not be able to reap the benefits of increased leisure time and greater wealth.

The economic system is the determinant of the way technology will be employed, and dictate who benefits. Only in a system free from profit motive from the top can we live in a society that Marx describes as sharing in the general intellect, where technology and information are used foremostly to improve the lives of all human beings.

As AI scholars, we tend to speculate about ethical issues in responsible robotics. That is, how humans can teach ethics to machines. Ethics that humans often ignore and certainly disagree about, as evident in the concentration of wealth amongst a global elite while millions suffer in poverty, from preventable conditions. As humans, we tend to focus on small problems that AI can fix, ignoring the underlying socio-economic cause of them. Yet what if machines learn to think and operate ethically, and perhaps even to develop their own ethics? Perhaps artificial intelligence can do an even better job of making us compassionate, ethical humans.

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