

Workplace Automation and its Effect on Employment

Navyasree Sriramoju

Sushmitha Dandu

California State University, Los Angeles

Abstract

The primary goal of this report is to discuss the challenges of employment caused by automation in this modern world. This report aims to identify the effects of automation in the field of computers and industries, the link between automation and society, the challenges associated with robotization, and their impact.

The link between automation and its impact on employment is an unnoticed issue since automation is widely seen as a positive aspect due to technological progress and its advantage's. It accelerates manufacturing, improves the quality of products, speed of process and allows for a higher level of stability. However, the societal influence and the impacts on industries are not widely considered. This is the reason we found this topic interesting to bring out the facts with available resources.

This report will review the findings of current studies on the issue and address significant facts.

Introduction

The interest in automation and digital technologies and their effects on our societies has increased substantially. The invention of new technologies, and the increasing accessibility to some of them, led to questioning – once they are adopted - their impact on different elements of productive structures; on the one hand, the impact is on production processes and restructuring, while on the other interrelated hand, the attention has been shifting towards quantitative and qualitative effects on work organization and, more broadly, working conditions.

There was a time when the term “automation” was referred with advanced manufacturing plants full of robotics. While replacing the human labor with machines is the prime example of workplace automation. Automation is present in modern businesses of all sizes – including various features in common software applications, and more obvious implementations like self-driving vehicles or autonomous robots, tools, machines etc. There is a common misconception that automation involves robots, but it can be as simple as a set of tools housed within common business software programs.

What is workplace automation?

Workplace automation refers to the usage of systems which perform repetitive or predictable tasks without direct human inputs or manual intervention. Automation could be applied to tasks which involve physical actions using machinery or robots, or to data-driven processes using software and algorithms.

Present days, automation in the office has almost become software driven. Along with the migration towards cloud-based tools and applications, APIs, big data, machine learning, and artificial intelligence (AI) have paved the way for new advancements in analytics, driving even more efficient automation and the optimization of workflows and process.

Automation and their effects on employment

Most analysts agree that many jobs will be at risk due to automation – while on the other side many more jobs will also be created. However, as the MIT Technology Review discovered last year when it analyzed from several reports published by a wide range of companies, think tanks and research institutions, little consistency exists between experts as to how deeply the impact of automation on employment will be felt over the next few coming years.

Predicted Jobs Automation Will Create and Destroy				
When	Where	Jobs Destroyed	Jobs Created	Predictor
2016	worldwide		900,000 to 1,500,000	Metra Martech
2018	US jobs	13,852,530*	3,078,340*	Forrester
2020	worldwide		1,000,000-2,000,000	Metra Martech
2020	worldwide	1,800,000	2,300,000	Gartner
2020	sampling of 15 countries	7,100,000	2,000,000	World Economic Forum (WEF)
2021	worldwide		1,900,000-3,500,000	The International Federation of Robotics
2021	US jobs	9,108,900*		Forrester
2022	worldwide	1,000,000,000		Thomas Frey
2025	US jobs	24,186,240*	13,604,760*	Forrester
2025	US jobs	3,400,000		ScienceAlert
2027	US jobs	24,700,000	14,900,000	Forrester
2030	worldwide	2,000,000,000		Thomas Frey
2030	worldwide	400,000,000-800,000,000	555,000,000-890,000,000	McKinsey
2030	US jobs	58,164,320*		PWC
2035	US jobs	80,000,000		Bank of England
2035	UK jobs	15,000,000		Bank of England
No Date	US jobs	13,594,320*		OECD
No Date	UK jobs	13,700,000		IPPR

The 3 Waves of Automation

Different surveys and reports estimate 400 to 800 million jobs worldwide could be automated by 2030; an OECD study that suggests that 9% of jobs are automatable; and a 2013 Oxford study said 47% of US jobs are at high risk of automation in the next few decades.

These are indeed varying differing figures – so why is it that there is no clear consensus on the impact of automation on employment? As KPMG stated in its report Rise of the Humans 3, “In any sector you care to name, predictable planning horizons are collapsing with alarming speed and as they do, even the experts cannot agree on Artificial Intelligence ultimate workforce impact. Some predict jobs will be multiplying following a disruptive transition period. Others foresee a net loss of jobs to the economy and warn of the need to explore policy solutions such as a universal basic income or a reduced working week.”

Waves	Description and impact
Wave 1: Algorithmic wave (to early 2020s)	Automation of simple computational tasks and analysis of structured data, affecting data-driven sectors such as financial services.
Wave 2: Augmentation wave (to late 2020s)	Dynamic interaction with technology for clerical support and decision making. Also includes robotic tasks in semi-controlled environments such as moving objects in warehouses.
Wave 3: Autonomous wave (to mid- 2030s)	Automation of physical labour and manual dexterity, and problem solving in dynamic real-world situations that require responsive actions, such as in transport and construction.

First Wave

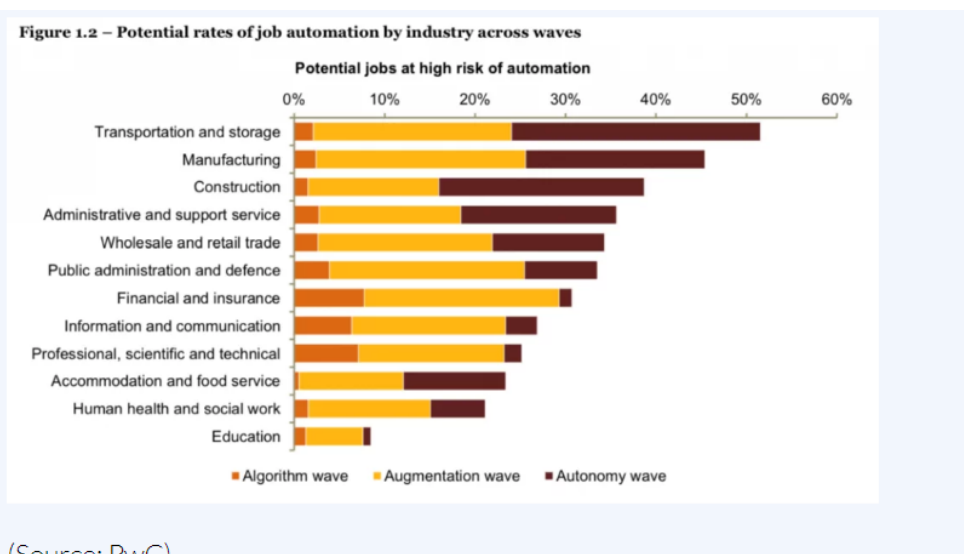
The first is the Algorithm Wave. Already well underway, it involves automating structured data analysis and simple digital tasks – such as credit scoring in the financial services sector, for instance. PwC predicts this wave could reach maturity by the early 2020s.

Second Wave

Next will come the Augmentation Wave – also underway, though not likely to reach maturity until the late 2020s. The Augmentation Wave is focused on the automation of repeatable tasks (see Everything You Need to Know About Robotic Process Automation) and exchanging information, as well as further developments in manufacturing and warehouse robots, aerial drones, and semi-autonomous vehicles.

Third Wave

Finally, the third Autonomy Wave could come to maturity by the mid-2030s, when AI will likely be able to analyze data from multiple sources, make decisions and take real – including physical – actions in real-time with little or no human input. For example, fully autonomous driverless vehicles could roll out at scale across the economy in this phase, impacting driving employment in a big, big way.



Field of Computer's

Drawbacks of Automation in the Workplace

1) Cost of Implementation: While automation can gain and result in significant profits, it's important to notice the upfront costs when calculating potential revenue. These include direct costs which include purchasing software licenses, working with vendors for configuration and rollout, data infrastructure and governance, and ongoing maintenance, as well as the costs associated with employee training, software monitoring and support, and more.

Businesses that require highly customized solutions can expect to pay an additional premium amount. These capital expenditures can be a difficult obstacle for companies to overcome if they are already operating on tight margins or running in losses.

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2) Shifts in Employee Roles: The number of managers in an organization decreases with automation in the workplace, likely because automated processes require less oversight. This trend will continue with an increase in employment for high- and low-skilled workers, and a decrease for middle-skilled workers which leads to imbalance in the work environment.

3) Need for Reskilling and Training: As automation takes over certain tasks and shifts the types of roles in demand, employees will need substantive upskilling and reskilling to thrive

to sustain in the workplace. McKinsey & Company predicts that demand for basic literacy and numeracy skills will fall by 20% in the next decade while the demand for technological skills will rise by more than 50%. Additionally, demand for soft skills that automation cannot duplicate, like relationship-building and effective communication, will continue to rise without any effect.

4) Loss of Flexibility: While today's automation technology can be narrowly tailored to suit specific business needs, there's no denying it removes a certain human touch from the equation. For example, a customer service chatbot will have a harder time parsing a customer's specific needs than a human representative, which can result in customer frustration and dissatisfaction. Similarly, customized approaches to specific tasks or processes may still require manual intervention and human brain.

Few examples of automation in workplace:

a) Marketing automation: Automated processes that send text messages in response to certain triggers or chat boxes to ensure companies can reach out the potential buyers as soon as they're ready to purchase.

b) Human resources automation: Automated processes that handle payroll of employees, expense reimbursements, timesheets, and more.

3) Inventory management and distribution automation: Tools to help predict demand and supply, track inventory, and alert managers to bottlenecks.

4) Data entry automation: Processes to keep data clean and up to date without manual inputs.

5) Data mining and analytics automation: Tools to uncover trends and make predictions without a human crunching the numbers or the calculations.

6) Customer relations automation: Automated chatbots and other communications tools to help customers get a timely response to all their queries.

Field of Industries

The impact of robots varies depending on the respective sector like industries, geographic areas, and population groups. Unsurprisingly, the effect of robots is mostly concentrated in manufacturing. The automotive industry has adopted robots more than any other industry, the researchers write, employing 38% of existing robots with adoption of up to 7.5 robots per thousand workers.

The electronics industry employs 15% of robots, while plastics and chemicals employ 10%. Employees in these industries saw the most negative effects, and researchers also estimate negative effects for workers in construction and retail, as well as personal services.

Robots are most likely to affect routine manual occupations and lower- and middle-class workers, and particularly blue-collar workers, including machinists, assemblers, material handlers, and welders, Acemoglu and Restrepo write. Both men and women are affected by adoption of robots, though men slightly more. For men, impacts are seen most in manufacturing jobs. For women, the impacts were seen most in non-manufacturing jobs.

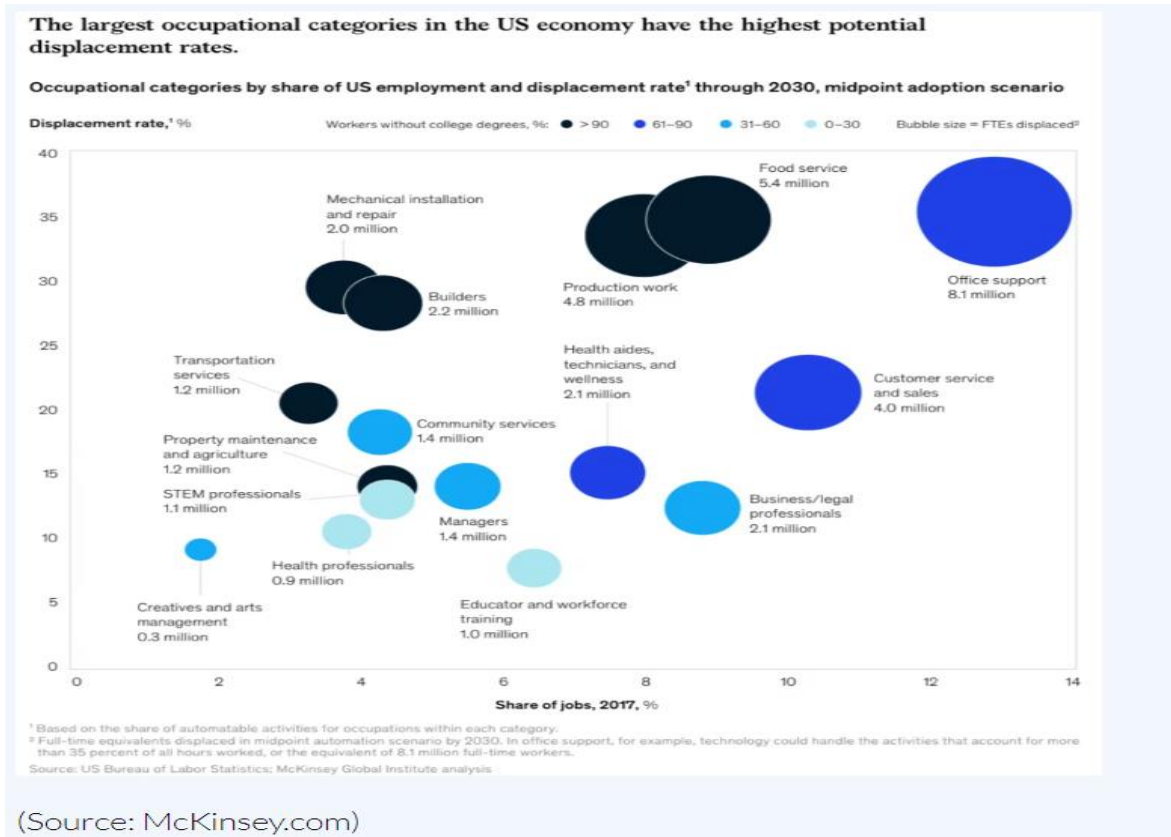
Robots negatively affect workers at all education levels, though workers without college degrees were impacted far more than those with a college degree or more. The researchers also found robot adoption does not have a positive effect on workers with master's or advanced

degrees, which could indicate that unlike other technology, industrial robots are not directly complementing high-skill workers.

Who Will Feel the Impact of Automation on Employment First and Most?

These are the questions that McKinsey Global Institute (MGI) set out to answer in its 2019 paper *The Future of Work in America: People and Places, Today and Tomorrow*. Like PwC, MGI believes that the impact of automation on employment will not be felt evenly across industries and timeframes. For example, beneath the Algorithm Wave, financial services jobs are relatively susceptible to automation in the shorter term, while driving and transportation jobs are more vulnerable in the longer term when the Autonomy Wave finally takes hold.

Looking at 16 occupational categories by share of US employment and displacement rate through 2030, MGI finds that the coming waves of automation (Algorithm and Augmentation, in PwC's terms) will affect some of the largest occupational categories in the US economy, including the office support, food services, production works, all kinds of customer services, and retail sales. In fact, nearly 40% of current US jobs are in occupational categories that could shrink between now and 2030, MGI says. The common thread among these shrinking roles? They involve many routines or physical tasks that are for automation.



As such, less-educated workers are most likely to be displaced or replaced, MGI says, while automation will pose particular challenges for two categories of worker's they are youngest and oldest workers.

Individuals with high school degrees or less are four times more likely to be in a highly automatable role than individuals with a bachelor's degree or postgraduates and as much as 14 times more vulnerable than someone with a graduation degree. This definitely has a particular impact on certain demographic groups that have lower educational attainment history. MGI finds, for instance, that Hispanic workers are overrepresented in foodservice roles and have the highest rate of potential displacement among all minority groups for about 25.5 %, or 7.4 million individuals. The potential displacement rate for African Americans is about 23.1 % (4.6 million

people). For white workers, the rate is about 22.4%, while Asian-American workers have the lowest rate at 21.7%.

Young people, meanwhile, will likely need to build their new career paths and find new ways to gain a foothold in the competitive working world. While previous generations often found their first jobs in retail or food services roles that gave them their first taste of work and embedded valuable soft skills and experience that would stay with them forever these are the estimated roles that automation could soon phase out. In all, roughly 14.7 million workers under the age of 34 could soon be displaced or replaced by automation.

For those over 50, the impact of automation on employment is to the tune of 11.5 million US workers. Though some are of course already close to the stage of retirement, others have many years ahead of them yet. Will they be willing or able to make a drastic change to reskill or retrain themselves after spending much of their career doing one thing to train for different lines of work?

And what about the gender divide? A UK study by the Office for National Statistics (ONS) found that 70.2% of the roles at high risk of automation in the short term are currently held by women employees. However, MGI takes a longer view and concludes that women may be better positioned for the future job growth. Many specific jobs skew towards one gender or the other – women, for example, make up the majority of bookkeepers and administrative assistants, while drivers and assembly line workers are predominately male. Overall, MGI's midpoint automation scenario suggests that women currently represent 47% of workers that will be displaced by automation, while men represent 53%. Based on the current gender share of occupations, MGI predicts that women could capture 58% of net job growth through 2030.

MGI's research only considers jobs that exist today. The fact is, however, that technology is likely to create new jobs we cannot even imagine at present. In fact, MGI's research suggests that about 8% to 9% of jobs in 2030 will be ones that do not yet exist. However, currently, men are more heavily represented in "frontier" jobs that involve cutting-edge technologies – and this may put them in a better position for the jobs that have yet to emerge. As ever, the need to improve the representation of women in the tech sector remains a priority.

Conclusion

As experts and analysts around the world peer into their crystal balls, though they can't seem to agree upon the precise extent of the impact of automation on employment, what is certain is that there will be an impact – across every sector, every role and every demographic. It seems that in the long run, less well-educated workers are particularly exposed to automation, as they tend to be employed in roles that have the greatest potential to be automated. And this emphasizes the importance of increased personal and company investment in lifelong learning and retraining. While some roles are more vulnerable to automation in the shorter term than others, all workers – as well as young people still in education – need to start planning and preparing for the future. We leave you with this parting piece of advice from the MGI report.

References

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