

The Impact of Robotic and Automation Technology & Solving the Threat of Increased Automation to Indian Employment

Rohan Yelamaneni

Nova Classical Academy, USA

ABSTRACT

India is already struggling with high unemployment, especially among youth, due to a misalignment between education and current labor demand, as well as a large population. Increased use of robotic and automation technology exacerbates unemployment in the short run by displacing low-skilled jobs. Indian policymakers should introduce a policy framework involving reskilling workers at risk through reforming universities and creating affordable digital programs, providing security to displaced workers, expanding digitalization to rural areas, and incentivizing industries to support workers' transition. Adopting such policies will minimize the adverse economic effects of automation and support sustainable growth.

Background & Methodology

India's unemployment rate stood at 9.2% in June 2024, a sharp increase from 7% in May 2024, according to the Centre for Monitoring Indian Economy (CMIE). Data from the India Employment Report 2024 states that despite India's working population increased from 61% in 2011 to 64% in 2021, the percent of youth involved in economic activities declined to 37% in 2022.

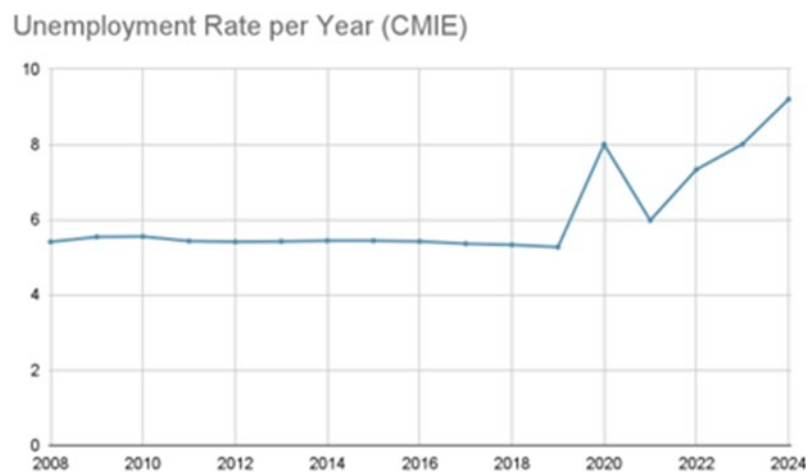


Figure 1. Indian Unemployment Rate (Centre for Monitoring Indian Economy)

India's large population, especially youth, has increased the number of graduates seeking employment. However, the job market is unable to accommodate the growing labor force, resulting in graduates either looking for

undermining jobs or staying frictionally unemployed. In addition, Indian colleges tend to emphasize higher education rather than relevant skills for the job market, leaving the youth ill-prepared and struggling to find jobs that require their talents. This forces many people to take low-end jobs or jobs centered around manual labor.

Rapid introduction of robotic and automation technology to India would exacerbate this problem by displacing many Indians from their low-end/labor-centric jobs, leading to mass unemployment across various social classes. A report from Oxford Martin School (2016) claims that 69% of jobs in India are at risk from automation. In September 2017, HfS Research, a global services consulting firm, predicted that the Indian IT sector alone would lose approximately 700,000 low-skilled jobs to automation.

The apocalyptic argument that India faces large-scale technological unemployment is exaggerated; in the *far* long run, the net change in unemployment due to automation will converge to zero as higher productivity of automated tasks demands complementary tasks performed by high-skilled labor, and the economy benefits from a demand spillover resulting from lower prices and increased leisure. However, introducing automation to a country with an unprepared workforce will cause a nationwide disparity in production vs consumer spending, potentially leading to a demand-side recession. India is still getting ready for this shift due to its current economic position and its aforementioned unemployment struggles. Therefore, adopting automation technology should arguably be withheld until India's workforce can effectively transition into automation. However, this is also not viable as it would hinder India's GDP growth. Therefore, a solution that advances India's economic development, leveraging automation while minimizing the negative impact on employment, is needed.

Policy Suggestions

Indian policymakers should develop a blueprint that would serve as a “plan of action,” utilizing multiple policies to address increased unemployment due to automation.

Governments Should Focus on Upskilling and Reskilling Workers

By focusing on upskilling or reskilling workers, the government can ensure they can contribute to an automated society. This goal should be accomplished in two ways: remodeling universities and creating new education programs. Remodeling Universities will allow future students to learn jobs applicable to an automated market, as seen in Indonesia, another emerging market. In a 2021 National Labor Force Survey data of Indonesia, graduates from vocational schools that taught relevant skills were more resilient and even had higher average incomes during the pandemic-related unemployment crisis.

India has already taken steps to address its antiquated education systems through the National Education Policy 2020 (NEP 2020). Although it was merely a proposition, the NEP 2020 makes critical changes to the current program. It calls for a curriculum overhaul to include industry-relevant skills such as technical and digital skills, soft skills, and even vocational education for rural areas of the country. It mandates foundational literacy, deliberately allows international campuses to establish branches in India, and promotes Education Tech. The NEP 2020 is designed to make education more equitable and helpful by establishing many new organizations to manage each aspect of its framework. The plan is comprehensive and designed to be actionable; Indian policymakers only have to focus on its fast implementation.

Additionally, new, affordable re-education programs should be established for those already in the labor market and at risk of being replaced by automation. As many individuals have either already been educated or cannot afford education, re-education programs should be affordable and easy to access. A potential option can be digital programs to reskill workers, saving time and minimizing costs for both workers and the government.

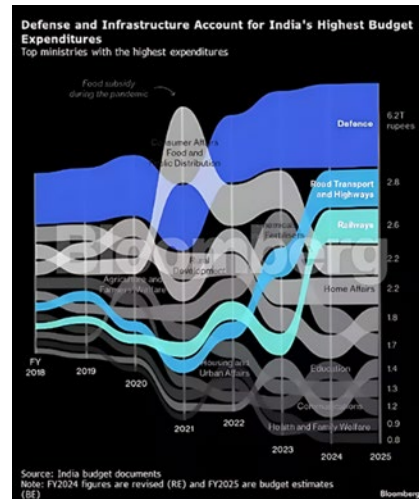


Figure 2. Defense and Infrastructure Account

Establish Social Security Nets and Welfare Programs to Support Reskilling Displaced Workers

Ensuring workers have sound social security during the transition to automation is vital to preserving the integrity of the workforce. Welfare helps displaced workers continue participating in the economy. Inequality is also reduced as welfare undermines the impact of economic changes on workers and allows more economic mobility.

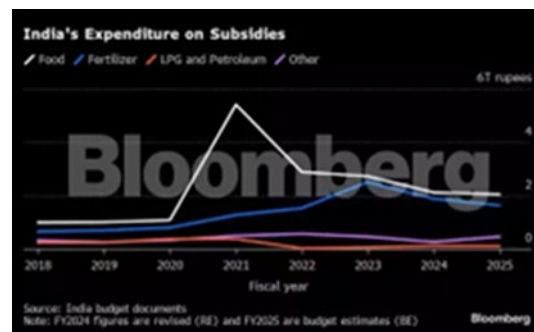


Figure 3. India's Expenditure on Subsidies

Although Implementing fallback options and reskilling programs can be expensive and strain the national budget, India can divert money from other economic sectors to use in its automation fallback plan. The nature of the plan allows funding to taper off as more of the country embraces robotic and automation technology, so temporarily cutting off some defense spending could help fund the programs or even reducing agricultural subsidies to fund these fallback programs, as ideally, more agriculture workers would find new jobs thanks to the promotion of other labor.

Promote Expansion of the Digital Economy

By promoting the digital economy, policymakers can create flexible employment opportunities by expanding job opportunities into rural areas. As many rural workers are not professionally employed, this expansion will help increase employment in rural areas and further India's digital progress. To do this, the government must support developing and regulating digital platforms that allow remote work, ensure labor protections, and, most importantly, expand rural

internet access and digital infrastructure to enable participation in the digital economy. Although the NEP 2020 somewhat addresses this by promising the expansion of digital education and more vocational training programs for rural workers, more targeted policies are required to solve rural communities' specific challenges in accessing and utilizing digital platforms. "Consistent digital access (to hardware, software, wifi, and data) is a foundational requirement for digital literacy and confidence using technology." Policymakers should include incentives for private sector investments in rural broadband infrastructure, subsidized internet access for low-income households, and tailored digital literacy programs to equip rural populations with the necessary skills. Partnerships with local governments can ensure these initiatives are effectively implemented nationwide. The government can significantly enhance rural employment opportunities, bridge the digital divide, and drive inclusive economic growth across India.

Collaborate With Industry to Ensure Employment Needs Are Met

Government collaboration with private industry is critical to automation. As it stands, India has low wages compared to other parts of the world, such as Australia. Countries with high labor costs, like Australia (\$55 per hour in 2014), will have more incentive than India (\$5.24 in 2014) to adopt robots. However, India's labor costs have recently increased as its economy grows. India experienced an increase of 6.6% compared to last year and witnessed 55% annualized growth between 2010-2021. As automation would lower labor costs and reduce inefficiencies, private industries are bound to replace workers with machines. The government should limit this man-to-machine replacement in industrial plants and factories by incentivizing companies to invest in employee retraining and upskilling programs. Policymakers can help mitigate the social impact of job displacement by providing tax breaks, grants, or subsidies to businesses that actively support their workers' transition to new roles created by automation. Through the support of industry-funded programs, policymakers can ensure that workers can transition jobs effectively, increasing economic activity while limiting unemployment. From reskilling workers, industries could take a staged approach to introduce new technology and reskilled workers in batches, further mitigating the threat of job loss.

An oversight body should be established and tasked with reviewing automation integration plans submitted by companies. This body can ensure compliance with workforce retention requirements and support businesses in implementing effective retraining initiatives. By taking a controlled approach to automation, the government can safeguard employment while ensuring that robotic and automation technology benefits both industries and workers.

Conclusion

To avoid the risk of substantial unemployment from the introduction of robotic and automation technology, the government can develop a comprehensive policy framework by reskilling workers following the NEP 2020, establishing social security nets and welfare for workers displaced by automation, expanding the digital economy to rural communities to provide a platform for higher education, and work with industries to mitigate job displacement in workplaces. Parliament's policymakers must administer the suggested framework or similar policies to respond to automation's impact on the nation and continue economic growth.

As previously stated, unemployment from automation will not change much in the long run. However, short-run unemployment spikes in India will have to be managed at scale by governments and industries for a smooth transformation of the economy. Effective public policy reskilling the workforce, expanding digital infrastructure, and providing social security nets are critical measures to prevent the Indian economy from being crippled due to the inevitable rise of automation. Only through comprehensive and forward-thinking changes can policymakers secure a stable and prosperous future for India.

Acknowledgments

I would like to thank my advisor for the valuable insight provided to me on this topic.

References

- The Quint. (2019). [Review of *Unemployment In India: Engineers Struggling Due to Skill Gap*]. In Youtube. <https://www.youtube.com/watch?v=k4Do3JSBflc>
- Forbes India. (2024, February 19). *Unemployment Rate In India (2008 to 2023): Current Rate, Historical Trends And More*. Forbes India. <https://www.forbesindia.com/article/explainers/unemployment-rate-in-india/87441/1>
- More and better vocational education could help address India's skills gap. (2023, May 22). Times Higher Education (THE). <https://www.timeshighereducation.com/opinion/more-and-better-vocational-education-could-help-address-indias-skills-gap>
- Nakamura, H., & Zeira, J. (2024). Automation and unemployment: help is on the way. *Journal of Economic Growth (Boston, Mass.)*, 29(2), 215–250. <https://doi.org/10.1007/s10887-023-09233-9>
- Gregory, T., Salomons, A., & Zierhan, U. (2022). Racing with or against the machine? Evidence on the role of trade in Europe. *Journal of European Economic Association*, 20(2), 869–906. <https://doi.org/10.1093/jeea/jvab040>
- Acemoglu, D., & Restrepo, P. (2018). The race between man and machine: Implications of technology for growth, factor shares and employment. *American Economic Review*, 108(6), 1488–1542. <https://doi.org/10.1257/aer.20160696>
- Ariansyah, K., Wismayanti, Y. F., Savitri, R., Listanto, V., Aswin, A., Ahad, M. P. Y., & Cahyarini, B. R. (2024). Comparing labor market performance of vocational and general school graduates in Indonesia: insights from stable and crisis conditions. *Empirical Research in Vocational Education and Training*, 16(1), 5–22. <https://doi.org/10.1186/s40461-024-00160-6>
- Haugen, S., Hallstrom, L., Grant, P., Cha, J., & MacQuarrie, P. (2021). Policy Responses to Automation in Canada. *Journal of Rural and Community Development*, 16(1), 1.
- Diebold, J. (1959). Automation Needs a Human Policy. In *Challenge (White Plains)* (Vol. 7, Issue 8, pp. 42–46). Routledge. <https://doi.org/10.1080/05775132.1959.11468910>
- Runde, D. F., Bandura, R., & Hardman, A. (2024). Expanding Workforce Development to Enable Nearshoring in the Northern Triangle. In *Policy File*. Center for Strategic and International Studies.
- Karabarbounis, L. (2024). Perspectives on the Labor Share. *The Journal of Economic Perspectives*, 38(2), 107–136. <https://doi.org/10.1257/jep.38.2.107>
- Ariansyah, K., Wismayanti, Y. F., Savitri, R., Listanto, V., Aswin, A., Ahad, M. P. Y., & Cahyarini, B. R. (2024). Comparing labor market performance of vocational and general school graduates in Indonesia: insights from stable and crisis conditions. *Empirical Research in Vocational Education and Training*, 16(1), 5–22. <https://doi.org/10.1186/s40461-024-00160-6>
- Ramaswamy, K. (2018). Technological Change, Automation and Employment: A Short Review of Theory and Evidence. *International Review of Business and Economics*, 2(2). <https://digitalcommons.du.edu/irbe/vol2/iss2/1/>
- Elad, B. (2023, May 21). *Average Labour Cost Statistics - By Country, Demographics, Hours, Sectors*. Enterprise Apps Today. <https://www.enterpriseappstoday.com/stats/labour-cost-statistics.html>
- Ministry of Human Resource Development. (2020). *National Education Policy 2020 Ministry of Human Resource Development Government of India*. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
- Haugen, S., Hallstrom, L., Grant, P., Cha, J., & MacQuarrie, P. (2021). Policy Responses to Automation in Canada. *Journal of Rural and Community Development*, 16(1). <https://journals.brandonu.ca/jrcd/article/view/1894>

CMIE. (n.d.). Wwww.cmie.com.

<https://www.cmie.com/kommon/bin/sr.php?kall=warticle&dt=20240701180501&msec=110>

Roy, A., & Shadab Nazmi. (2024, July 24). India Budget in Charts: More Job Creation, Spending, Fiscal Debt Control. Bloomberg.com; Bloomberg. <https://www.bloomberg.com/news/articles/2024-07-24/india-s-budget-in-five-key-charts-more-spending-debt-control>

Bloomberg. (2024, July 24). *Budget 2024 in five key charts: More spending, debt control*. The Economic Times; Economic Times. <https://economictimes.indiatimes.com/news/economy/indicators/budget-2024-in-five-key-charts-more-spending-debt-control/articleshow/111973438.cms>

How Automation Will Shape the Future of Work in India. (n.d.). Thediplomat.com.

<https://thediplomat.com/2024/02/how-automation-will-shape-the-future-of-work-in-india/>

Automation and the Future of Jobs in India. (2018, November 5). Center for the Advanced Study of India (CASI). <https://casi.sas.upenn.edu/iit/kuriakoseiyer>

Islam, I. (2018). Automation and the Future of Employment: Implications for India. *South Asian Journal of Human Resources Management*, 5(2), 234–243. <https://doi.org/10.1177/2322093718802972>

Ghose, A. K. (2004). The Employment Challenge in India. *Economic and Political Weekly*, 39(48), 5106–5116. <https://www.jstor.org/stable/4415834>

The World Bank. (2023, September 27). *India Overview*. World Bank.

<https://www.worldbank.org/en/country/india/overview>