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**Brief 67:2021**

# AUTOMATION, INEQUALITY

# AND THE FUTURE OF WORK

**Pakistan Institute of  
Development Economics**



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PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

# AUTOMATION, INEQUALITY AND THE FUTURE OF WORK

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After the industrial revolution, digital technology is something changing the course of the world order. The exponential growth of computing power, artificial intelligence (AI), robots, digitization, the Internet of Things (IoT), and blockchain technology in recent times has impacted every major sector of the economy and is revolutionizing the way we interact and operate businesses. In general, many of these changes have proved to be beneficial in combating contemporary issues of the society i.e., problem aging population, expanding consumer choice, increasing energy efficiency, and simplifying distributed transactions and record-keeping, to name a few. Furthermore, according to experts, it is just the tip of the iceberg and the next couple of decades will witness it on a scale never-before-seen.

However, there exists some reservation to this fast-paced advancement of technology, particularly artificial intelligence and robots. It is believed that it will predominantly replace human labor and restructure the labor market by altering the relative contributions of various inputs of production. The majority of labor may become less valued, decreasing employees' real pay and standard of living. As a result, people may end up poorer than their parents.

### **Key Objectives**

- Understanding the impact of Automation, and artificial intelligence
- Role of technologies like artificial intelligence, Internet of Things, digitization, and robotics in the labor market i.e., in terms of real wages, productivity, and standard of living

### **Key Messages**

- Over the past two decades, there have been significant developments in artificial intelligence and robotics. Future advancements are projected to be even more remarkable, with many analysts predicting that these technologies will transform work all over the world.
- Technology is changing the way we work, but the questions about which jobs are lost and which are acquired, as well as how those changes are critical in determining whether people will be able to transition from working in jobs of yesterday to the employment of the future.
- The next institutional challenge for both the developed and developing nations is the future of work. There has been a fairly remarkable shift against labor in the US and many developed nations.
- There is a rising concern that automation, AI, and robotics will replace workers in tasks that they previously did, resulting in a powerful displacement impact.
- Contrary to popular belief in macroeconomics and labor economics that productivity-enhancing technologies automatically boost overall labor demand, the displacement effect can reduce labor demand, wages, and employment. Furthermore, the displacement effect means that gains in output per worker as a result of automation will not result in a commensurate increase in labor demand. The displacement impact results in a decoupling of wages and output per worker, as well as a decrease in the labor portion of national revenue.
- Over the past two decades, the labor share in the United States, the United Kingdom, and the developing world has declined; what underpins this movement is the balance of power between capital and labor.
- The income disparity is a significant discrepancy between the positions that are being lost and those that are being obtained. Many of the lost positions are middle-skilled employment with a middle-class income. Many people in job-losing occupations lack the skills required to seamlessly transition into higher-paying positions.
- There has been a significant increase in the use of robots around the world, which has more than doubled in most situations over the last 20 years. In 1995, the United States had a stock of 0.49 robots per thousand workers, which increased to 1.79 robots per thousand workers in 2017.
- Whenever we look at automation there are two aspects: one is the productivity effect and the other is the displacement effect.
- The majority of economists believe that productivity produced by technology is our most powerful ally in terms of increasing prosperity. That is typically true, but when we look at automation technology, it becomes more difficult. Productivity is wonderful, but it may be accompanied by displacement, and if that is the case, there is no assurance that this productivity will be larger than displacement.



## **Automation, Work, and Wages: An Overview**

- In most sectors, production necessitates the performance of many tasks at the same time. Textile production, for example, necessitates the production of fiber, the production of yarn from the fiber, the production of the relevant fabric from the yarn, pre-treatment dyeing and printing, finishing, and a variety of auxiliary tasks such as design, planning, marketing, transportation, and retail.
- Each of these tasks can be completed using a combination of human work and machine labor. Most of these jobs were time-consuming and labor-intensive at the start of the British Industrial Revolution. Many of the early technologies of the time were aimed at automating spinning and weaving by replacing automated processes for trained craftsmen's labor.
- Automation examples are not limited to industry and agriculture. A variety of functions performed by white-collar professionals in retail, wholesale, and business services have already been mechanized by computer software. Software and artificial intelligence-powered systems can now retrieve information, coordinate logistics, manage inventories, prepare taxes, provide financial services, interpret difficult documents, produce corporate reports, draught legal pleadings, and detect diseases. They are expected to get substantially better at these jobs during the coming few years.
- As these instances show, automation entails the replacement of machines for labor, which results in the displacement of workers from the tasks being automated. Most methods to production functions and labor demand employed in macroeconomics and labor economics ignore or only marginally account for this displacement impact.

## **Tasks, Technologies, and Displacement**

- Labor and capital have comparative advantages in different tasks, which means that labor productivity varies between tasks. Automation on a large scale is a broadening of the set of tasks that can be generated using capital. Automation will result in the replacement of capital for labor in these tasks if capital is sufficiently cheap or productive at the margin. This substitution causes workers to be displaced from the jobs that are being mechanized, resulting in the aforementioned displacement impact.
- The displacement impact may reduce labor demand and the equilibrium wage rate. That technology advances may cut overall worker wages is a crucial topic to underline because it is often overlooked. With an elastic labor supply, a decrease in labor demand likewise leads to a decrease in employment.
- Unlike the traditional strategy, which is based on factor-augmenting technical innovations, a task-based approach immediately opens the door to productivity-enhancing technological developments that concurrently lower wages and employment.

## **Missing Productivity and Excessive Automation**

- The fact that, despite the adoption of numerous sophisticated technologies, productivity growth has been modest. Except for the years 1995-2004, US productivity growth after 1974 has been dismal in comparison to its postwar record.
- Between 1947 and 1973, the yearly rate of worker productivity growth in the US economy averaged 2.7 percent, but it only averaged 1.5 percent between 1974 and 1994. Between 1995 and 2004, average productivity growth returned to 2.8 percent, only to fall back to 1.3 percent between 2005 and 2015.

## **Conclusion**

Automation is conceived as a replacement of labor in tasks that it previously performed. This sort of substitution has a direct displacement effect on the labor market and if other economic forces do not counteract this displacement effect, it will lower labor demand resulting in unemployment and loss of income. Moreover, it is argued that Automation does have a positive impact on productivity. However, this productivity effect is negligible if compared to the unemployment effect generated by automation. At the same time, there emerges a problem of skilled workers. For example, automation will require a special type of worker, meaning new jobs, activities, industries, and tasks, while the existing curriculum does not align with it. Thus to take full advantage of this automation era we have to re-align our academic curricula with it and skill our labor with these contemporary skills. In doing so, it will also mitigate the productivity-unemployment dichotomy of automation.



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