



The Technology Trap: Capital, Labor and Power in the Age of Automation.

Carl Benedikt Frey. Princeton University Press, 41 William Street, Princeton, New Jersey 08540. 2019. xiv + 465 pages. Price: US\$ 29.95/£25.00.

What can we learn from history? How was technological progress viewed by society over the centuries? What role did it play in economic growth? If Artificial Intelligence (AI) is the technological revolution of the 21st century, what lessons from the past can help us handle the change in the short run and prepare us to be resilient in the foreseeable long run? The author offers perspectives from the pre-industrial era 10,000 years ago when agriculture began, till modern times. In the age of AI where computers learn themselves, it is posing new challenges for the society. The author has analysed the perspectives of economists who thought of the progress in terms of technologies that either enable labour (enabling technologies) or replace labour (replacing technologies). The success of the industrial revolution has been linked to the societal distribution of power and it certainly has lessons for the future. The author is determined to convince the reader that we can learn from the past and has done a fine balancing between the economist's perspectives and the historian's narratives. This book gives a biased western account of the technological progress that has taken place since the industrial revolution of the 18th and 19th century. Further the focus is clearly on the development of labour-saving technologies and not on the technological breakthroughs in general.

The book is divided into five parts, each one having its subparts. Each part is

preceded by its summary and followed by a conclusion. The book starts by taking a look at economic history in the preindustrial era when in spite of the emergence of significant new technologies, there was no significant improvement in material conditions of people. One of the reasons cited by the author is the description of technology during the Roman Empire as the 'most blameworthy product of humankind'. The author's research has unearthed evidence in the form of arguments by popular historians of that time which suggest that classical civilizations were oppressed by tradition and therefore emperors showed little interest in worker replacing technology. Slavery was definitely one of the motivations working against technology. Interestingly the subsequent innovations like wind power, mechanical clocks and printing press during the medieval period were accepted as they brought about economic progress but with delayed impact. Further analysis shows that it is the organizational, procedural and cultural behavioural innovations that shaped the economic growth. For example, the clock towers that were built for status and reputation, necessitated the need to have discipline and punctuality in transactions and public meetings. This resulted in acceptability of a mechanical clock as an innovation. At the end of part 1, the author has aptly concluded that while there was no dearth of innovators, there were fewer incentives to invest in machinery. The political power had more to lose due to social unrest caused by labour-replacing technologies and this led to a technology trap.

Contrastingly however, during the industrial revolution in the late 18th century and early 19th century, the author has clearly demonstrated how the British Government sided with innovators and funded their inventions such as power looms as it improved their competitiveness in trade. The fact that Parliament passed an act in 1769 that made destruction of machines a felony punishable by death is proof that rulers supported the technology at the cost of labour. However the growing adoption of technology heralded overall improvement in wellbeing and thus put more money in the pockets of the poor.

So it was only in the beginning of the 20th century that the people actually began to see technology working in their favour. Frey also makes a very interest-

ing observation that growth of the welfare state allowed the United States to take over technological leadership from Britain after the end of WWII. During the industrial revolution it was the general purpose technology like steam engines that was adapted to run industrial machines but during the twentieth century, electrical power was used not just to drive factories and create mass production but also manufacture home appliances thereby bringing the technology to the doorsteps of the common man. This relieved the housewife of day to day chores and drove her to acquire new skills thereby increasing her participation in the country's growth. The author brings out another façade of education as being a catalyst for technology adoption. The continued expansion of manufacturing and rising educational attainment allowed the vast majority to switch into better paying and less hazardous jobs. The next generation of workers got proper education and moved up the economic ladder. The active participation of labour in the mechanization process, gave rise to trade unions and hence more bargaining power. Abundance of semi-skilled jobs in factories and offices brought about prosperity to the middle class. This made ordinary American citizens, the prime beneficiary of progress. The author clearly brings out the differentiation between the labour-enabling technology in the second industrial revolution vis-à-vis the labour-replacing technology in the first industrial revolution in Britain. After all one must realize that America was created out of revolution against the concentration of power of the British monarchy and was founded on the principle of equality and self-rule by common man. Inequality was rampant during the 19th century but post WWII, workers saw their incomes rise steadily with mechanization as their skills were valued. While the poor and uneducated had little political voice, the working-class base broadened and political parties realized that there was no polarization, so they solicited support from the middle class by offering short-term benefits. This clientelism, the author argues, is one reason why socialism never arrived in America.

The later part of the twentieth century saw the advent of computers and the technology was once again seen as labour replacing. While robots replaced workers in repetitive jobs, skilled personnel were required as programmers. So the erosion

of old jobs gave rise to new jobs requiring different skills. The author argues that the experience of decades succeeding 1980s in many ways resembles that of the early 19th century when mechanization sounded a death knell for the labour market causing a reduction in workers' wages. Conditions of poverty/deprivation however look less harsh today as compared to the material conditions of Luddites.

So what lessons do we have for the future? Having said that computer revolution more closely resembles the experience of the industrial revolution, the author attempts to pinpoint the dangers of displacement of labour. In this next wave of automation, computers have begun to learn! AI will allow us to have driverless (autonomous) cars on roads and displace thousands of drivers. As billions of people interact online, they leave digital trails that allow algorithms to tap into their experience. Therefore data will be regarded as the new 'oil'. One reason why this experience is similar to that of the industrial revolution is that just like steam, electricity and computers, AI is also a general-purpose technology having a wide range of applications. With technology such as face recognition and speech recognition, it's easy to displace workers from call centres. Frey presents us with his research on the possibility of job automation based on some twenty thousand unique task descriptions. After eliminating common features, the final study looked at 702 occupations, in which 97% of the American workforce is employed. These included office and administrative support, production, transporta-

tion, logistics, food preparation and retail jobs. After a thorough analysis, their algorithm predicted that 47% of jobs could be automated. Most of these jobs were low-income jobs that do not require high levels of education. What lends credibility to this data is the fact that a number of studies of those including OECD also concur that unskilled jobs are exposed to automation. Their algorithm also predicted that lawyers, doctors and journalists are currently safe from automation. Quoting Mckinsey global institute study that AI adoption outside the tech sector is still at an early stage, the author concedes that AI has been deployed commercially only in 12% cases. While analysing the reasons, the author reckons that AI itself may not require large investments but complementary investments are required to deploy a machine learning system. While collection of data at 'point of sale' is a major challenge, analytical skills and training are also significant bottlenecks. Therefore it is predicted that countless ancillary inventions and adjustments are required for automation to happen. Before the productivity boom, as history tells us the economy will go through an adjustment process with slow economic growth. Drawing parallels to the industrial revolution and revolt of Luddites, the author fears that worker resistance and public scepticism could slow the pace of change with respect to AI in the short run.

So the question is how we tackle the deployment of AI amidst an issue of 4% unemployment in America. While the creative jobs of hairstylists, massage therapists, fitness trainers, etc. may be safe

from automation, many unskilled jobs of call centre agents, food preparers, cashiers and drivers seem set to vanish. The author recommends that society should recognize déjà vu. The challenge lies in the sphere of politics and not technology and hence to avoid the technology trap governments must pursue policies to kick start growth while helping workers to adjust to the wave of automation. Investment in early education based on the social cost of automation, removal of barriers to the relocation, job switching and boosting the incomes of low income households through tax credits are some of the recommendations made by the author.

Carl Benedict Frey has done full justice to the subject by not just providing us with a detailed account of how technology has entered our life space mainly over the last three centuries but also by deeply analysing our successes and failures in using technology to the advantage of mankind. In today's connected world, visionary leaders/policymakers, both with a capitalist and socialist mindset must draw lessons from the past and then carefully draw road maps for the future because the technology is here to stay and transform the quality of our lives.

MILIND S. PATKE

*Flat 06, Block 1,
BPCL Staff Colony,
Aziz Baug, Chembur,
Mumbai 400 074, India
e-mail: patkems2@gmail.com*