Fall 2015: The 21st Century and the Second Machine Age

The 21st Century and the Second Machine Age

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The noted English economic historian T.S. Ashton once wrote that the changes caused by the Industrial Revolution were not merely industrial, but social and intellectual as well. While the influence of new technologies on everyday life was easy to see and marvel at, the impact that technology had on society was less sudden and more akin to a balloon slowly being filled, until eventually it would burst. In his classic novel The Jungle, Upton Sinclair expounded upon this very idea. Sinclair wrote how industry changed the way people worked, lived, the amount of money they made (or didn't make), their political convictions and most memorably, how they ate. At the heart of Sinclair's tale was the influence of technological change. Sinclair wrote that sausages that were once handmade by thousands of workers were replaced by one woman who sat at a machine all day. Where the workers went, Sinclair pondered, no one knew. Yet, Sinclair did know, and his muckraking would cause a national sensation. However, what happens when machines replace people in the 21st century? This is the question that Erik Brynjolfsson and Andrew McAfee tackle in their insightful book, The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies.

It has been over 100 years since Sinclair wrote his socialist manifesto. His book was intended to be a societal and intellectual challenge to the "evils" of laissez-faire economic policies during the early 20th century. While his book was the catalyst for the food safety laws that we have today, even Sinclair would lament that it never achieved its intent. "I aimed at the public's heart," Sinclair told a reporter, "and by accident I hit it in the stomach." What Sinclair could not foresee is that while technological changes are rapid, societal norms (customs and habits) and how we think (economic, political and scientific theories) do not move in lockstep with the speed of technology. This relationship between technology and society was an ongoing struggle in the 20th century that has continued into the early 21st century.

In April of 2014, Floyd Norris of The New York Times wrote that while corporate profits are at their highest in at least 85 years, employee compensation is at its lowest in 65 years. Mr. Norris blamed globalization, the loss of the power of unions, and a "myriad of tax credits, deductions and preferences" for the growing disparity of wealth in America. Brynjolfsson and McAfee share Norris' belief that the disparity of wealth in America is a growing problem, but challenge the conventional view that it is due to the loss of union power or globalization.

Instead, Brynjolfsson and McAfee argue that as the first machine age of the Industrial Revolution enabled a few to amass incredible wealth, we are entering a second machine age, and that the changes to society will be just as dramatic.

The dichotomy in the accumulation of wealth between corporate America and main street America is evident. Over the past thirty years, as family incomes have stagnated, CEO pay has increased by more than 500 percent. According to the AFLCIO's Executive Paywatch, in 1983 the average CEO earned 46 times more than the average worker. Today, the executives at top companies make close to 330 times the average employee. Helping these companies compensate their top brass is the fact that while corporate profits are at their highest level since the Hoover administration, the effective tax rate that these companies pay is at its lowest since Hoover. Today, the effective corporate tax rate is 20.5%, more than 20% lower than when George W. Bush was president, and certainly a far cry from its apex of 47.3% during the Truman administration. For investors in stocks and management of publicly traded companies, these have been rewarding years, as this era of lower corporate taxes has helped bolster earnings and dividends.

For over thirty years, economists have pointed to globalization as the cause for this growing disparity of wealth in the United States, as many jobs were shipped off of U.S. shores. In 2005, Thomas Friedman promoted this idea when he warned readers in his aptly named book, The World is Flat, that jobs can easily be performed in India as well as Indiana. Nine years have passed since Friedman claimed that the U.S. economy was a deflating balloon; however, his predictions of the future have not fared well. Despite the ability to have operations anywhere in the world, the growing disparity of wealth is not a problem isolated to the U.S. Be it in China, India, Great Britain, Sweden, Russia, or Germany, the rich are getting richer and the middle class is shrinking.

Brynjolfsson and McAfee give many examples as to how machines are leading to income polarization and contributing to the disparity of wealth. For under $100, one can purchase a copy of TurboTax or Quickbooks, and perform many functions that would have once required a bookkeeper. The company that manufactures these products, Intuit, had $4.2 billion in sales in 2013, with only 8,500 employees. A task that once required a full-time bookkeeper can now be performed by someone with little accounting experience at a fraction of the cost, enabling the few that manufacture this software to reap a larger profit for themselves. Today's companies use this technology to be more efficient and profitable. The past chairman of Carpenter Technology Corporation, Paul Roedel, remarked that his first job out of college was to manually transcribe and calculate the company's depreciation. It took him close to seven months to do so and was a full-time job. Today, with revenues over $500 million, "CarTech" calculates its depreciation on a computer in less than one second.

As the U.S. unemployment number continues to fall from its high of 10.0% in October 2008 to its current low of 6.3%, many workers in the U.S. are returning to the workforce but

finding jobs that pay less than they did a few years ago. For those without a college degree, wages have fallen since 2000. Those with college degrees have seen their income remain relatively flat, while those with advanced degrees have fared much better. It is this disparity of incomes by level of education that has been the most challenging for nations, as no longer is the economic tide raising all boats.

It is the double-edged sword of technological advancements that makes one wonder whether technology is good or bad. The Luddites certainly had their opinion on the matter, but today we celebrate new technologies. Today's most successful companies make products that help consumers to be more efficient and/ or save money. Much as the switchboard operator was replaced in the 1960's, bookkeepers in the 1970's, and assembly workers in the 1980's, many middle class jobs have now been replaced by machines.

However, machines have not replaced all middle class jobs. To best understand how the second machine age has impacted the middle class, Daron Acemoglu and David Autor suggest that work can be divided into a two-by-two matrix: cognitive versus manual, and routine versus non-routine. They found that the demand for work has been falling most dramatically for routine tasks, regardless of whether they are cognitive or manual. These are the jobs that can most easily be replaced by machines and lead to job polarization, a collapse in the demand for middle-income jobs. However, non-routine cognitive jobs (financial analysts, doctors, professors, architects, etc.) and non-routine manual jobs (hairdresser, electrician, plumber, etc.) have held up relatively well.

What is evident in this second machine age is that the world we live in will require new tools for understanding (and hopefully, addressing) the societal and intellectual changes that technology is creating. Brynjolfsson and McAfee point out that we need a new way to measure our G.D.P.—this idea should be familiar to those who read our quarterly letters. Likewise, our economic theories are in need of an objective and honest review, as they are becoming more political platforms to preserve power than genuine attempts to improve the welfare of communities. We also need to improve how we educate our children. Our modern economy will provide few opportunities for those who are not educated, but boundless opportunities for those who are educated and can harness machines to increase their productivity.

The biggest challenge may be in how we address the societal and intellectual challenges that Ashton observed in the 20th century as the byproduct of technological change. As Brynjolfsson and McAfee conclude, "In the second machine age, we need to think much more deeply about what it is we really want and what we value, both as individuals and as a society. Our generation has inherited more opportunities to transform the world than any other. That's a cause for optimism, but only if we're mindful of our choices."