

Technology, Culture, and Dignity — Reading #2

Nicholas Eberstadt

Men at Work: America's Invisible Crisis (2016)

Introduction [excerpts]

[1] Over the past two generations, America has suffered a quiet catastrophe. That catastrophe is the collapse of work — for men. In the half-century between 1965 and 2015, work rates for the American male spiral relentlessly downward, and an ominous migration commenced: a "flight from work," in which ever-growing numbers of working-age men exited the labor force altogether. America is now home to an immense army of jobless men no longer even looking for work— more than 7 million alone between the ages of 25 and 55, the traditional prime of working life. The collapse of work for America's men is arguably a crisis for our nation— but it is a largely invisible crisis. It is almost never discussed in the public square. Somehow, we as a nation have managed to ignore this problem for decades, even as it has steadily worsened. There is perhaps no other instance in the modern American experience of the social change of such consequence receiving so little consideration by concerned citizens, intellectuals, business leaders, and policymakers.

[2] How big is the "men without work" problem today? Consider a single fact: in 2015, the work rate (or employment-to-population ratio) for American males ages twenty-five-to-fifty-four was slightly lower than it had been in 1940, which was at the tail end of the Great Depression. The general decline of work for grown men and the dramatic, continuing expansion of a class of un-working males (including both those who are ostensibly able-bodied and in the prime of life) constitute a fundamentally new and unfamiliar reality for America. So very new and unfamiliar is this crisis, in fact, that it has until now very largely gone unnoticed and unremarked upon. Our news media, our pundits, and our major political parties have somehow managed to overlook this extraordinary dislocation almost altogether.

[3] One reason the phenomenon has escaped notice is that there have been no obvious outward signs of national distress ascending from the American males massive and continuing post-more exit us from paid employment: no national strikes, no great riots, no angry social paroxysms. In addition, America today is rich and, by all indications, getting even richer. Hence the end of work for a large, and steadily growing, share of working-age American men has been met to date with public complacency, in part because we evidently can afford to do so. And this is precisely the problem: for the genial indifference with which the rest of society has greeted the growing absence of adult men from the productive economy is in itself powerful testimony that *these men have become essentially dispensable*.

[4] But the progressive detachment of so many adult American men from the reality and routines of regular paid labor poses a threat to our nation's future prosperity. It can only result in lower living standards, greater economic disparities, and slower economic growth than we might otherwise expect. And the troubles posed by this male flight from work are by no means solely economic. It is also a social crisis— and, I shall argue, a moral crisis. The growing incapability of grown men to function as breadwinners cannot help but undermine the American family. It casts those who nature designed to be strong into the role of dependents— on their wives or girlfriends, on their aging parents, or on government welfare. Among those who should be most capable of shouldering the burdens of civic responsibilities, it instead encourages sloth, idleness, and vices perhaps more insidious. Whether we choose to recognize it or not, this feature of the American condition— the new "men without work" normal— is inimical to the American tradition of self-reliance; it is subversive of our national ethos and arguably even of our civilization. Our nation cannot begin to grapple with this challenge to our future unless we first understand its genesis, its dimensions, and its implications.

The Fourth Industrial Revolution (2016)

Klaus Schwab

[1] The word "revolution" denotes abrupt and radical change. Revolutions have occurred throughout history when new technologies and novel ways of perceiving the world trigger a profound change in economic systems and social structures. Given that history is used as a frame of reference, the abruptness of these changes may take years to unfold. The first profound shift in our way of living — the transition from foraging to farming — happened around 10,000 years ago and was made possible by the domestication of animals. The agrarian revolution combined the efforts of animals with those of humans for the purpose of production, transportation and communication. Little by little, food production improved, spurring population growth and enabling larger human settlements. This eventually led to urbanization and the rise of cities.

[2] The agrarian revolution was followed by a series of industrial revolutions that began in the second half of the 18th century. These marked the transition from muscle power to mechanical power, evolving to where today, with the fourth industrial revolution, enhanced cognitive power is augmenting human production. The first industrial revolution spanned from about 1760 to around 1840. Triggered by the construction of railroads and the invention of the steam engine, it ushered in mechanical production. The second industrial revolution, which started in the late 19th century and into the early 20th century, made mass production possible, fostered by the advent of electricity and the assembly line. The third industrial revolution began in the 1960s. It is usually called the computer or digital revolution because it was catalysed by the development of semiconductors, mainframe computing (1960s), personal computing (1970s and 80s) and the internet (1990s).

[3] Mindful of the various definitions and academic arguments used to describe the first three industrial revolutions, I believe that today we are at the beginning of a fourth industrial revolution. It began at the turn of this century and builds on the digital revolution. It is characterized by a much more ubiquitous and mobile internet, by smaller and more powerful sensors that have become cheaper, and by artificial intelligence and machine learning . . .

[4] In Germany, there are discussions about "Industry 4.0", a term coined at the Hannover Fair in 2011 to describe how this will revolutionize the organization of global value chains. By enabling "smart factories", the fourth industrial revolution creates a world in which virtual and physical systems of manufacturing globally cooperate with each other in a flexible way. This enables the absolute customization of products and the creation of new operating models.

[5] The fourth industrial revolution, however, is not only about smart and connected machines and systems. Its scope is much wider. Occurring simultaneously are waves of further breakthroughs in areas ranging from gene sequencing to nanotechnology, from renewables to quantum computing. It is the fusion of these technologies and their interaction across the physical, digital and biological domains that make the fourth industrial revolution fundamentally different from previous revolutions. In this revolution, emerging technologies and broad-based innovation are diffusing much faster and more widely than in previous ones, which continue to unfold in some parts of the world. This second industrial revolution has yet to be fully experienced by 17% of world as nearly 1.3 billion people still lack access to electricity. This is also true for the third industrial revolution, with more than half of the world's population, 4 billion people, most of whom live in the developing world, lacking internet access. The spindle (the hallmark of the first industrial revolution) took almost 120 years to spread outside of Europe. By contrast, the internet permeated across the globe in less than a decade.

[6] Still valid today is the lesson from the first industrial revolution — that the extent to which society embraces technological innovation is a major determinant of progress. The government and public institutions, as well as the private sector, need to do their part, but it is also essential that citizens see the long-term benefits. I am convinced that the fourth industrial revolution will be every bit as powerful, impactful and historically important as the previous three. However I have two primary concerns about factors that may limit the potential of the fourth industrial revolution to be effectively and cohesively realized.

[7] First, I feel that the required levels of leadership and understanding of the changes underway, across all sectors, are low when contrasted with the need to rethink our economic, social and political systems to respond to the fourth industrial revolution. As a result, both at the national and global levels, the requisite institutional framework to govern the diffusion of innovation and mitigate the disruption is inadequate at best and, at worst, absent altogether.

[8] Second, the world lacks a consistent, positive and common narrative that outlines the opportunities and challenges of the fourth industrial revolution, a narrative that is essential if we are to empower a diverse set of individuals and communities and avoid a popular backlash against the fundamental changes underway.

[9] The premise of this book is that technology and digitization will revolutionize everything, making the overused and often ill-used adage "this time is different" apt. Simply put, major technological innovations are on the brink of fuelling momentous change throughout the world — inevitably so. The scale and scope of change explain why disruption and innovation feel so acute today. The speed of innovation in terms of both its development and diffusion is faster than ever. Today's disruptors—Airbnb, Uber, Alibaba and the like— now household names - were relatively unknown just a few years ago. The ubiquitous iPhone was first launched in 2007. Yet there will be as many as 2 billion smart phones by the end of 2015. In 2010 Google announced its first fully autonomous car. Such vehicles could soon become a widespread reality on the road.

[10] One could go on. But it is not only speed; returns to scale are equally staggering. Digitization means automation, which in turn means that companies do not incur diminishing returns to scale (or less of them, at least). To give a sense of what this means at the aggregate level, compare Detroit in 1990 (then a major centre of traditional industries) with Silicon Valley in 2014. In 1990, the three biggest companies in Detroit had a combined market capitalization of \$36 billion, revenues of \$250 billion, and 1.2 million employees. In 2014, the three biggest companies in Silicon Valley had a considerably higher market capitalization (\$1.09 trillion), generated roughly the same revenues (\$247 billion), but with about 10 times fewer employees (137,000).

[11] The fact that a unit of wealth is created today with much fewer workers compared to 10 or 15 years ago is possible because digital businesses have marginal costs that tend towards zero. Additionally, the reality of the digital age is that many new businesses provide "information goods" with storage, transportation and replication costs that are virtually nil. Some disruptive tech companies seem to require little capital to prosper. Businesses such as Instagram or WhatsApp, for example, did not require much funding to start up, changing the role of capital and scaling business in the context of the fourth industrial revolution. Overall, this shows how returns to scale further encourage scale and influence change across entire systems.

[12] Aside from speed and breadth, the fourth industrial revolution is unique because of the growing harmonization and integration of so many different disciplines and discoveries. Tangible innovations that result from interdependencies among different technologies are no longer science fiction. Today, for example, digital fabrication technologies can interact with the biological world. Some designers and architects are already mixing computational design, additive manufacturing, materials engineering and synthetic biology to pioneer systems that involve the interaction among micro-organisms, our bodies, the products we consume, and even the buildings we inhabit. In doing so, they are making (and even "growing") objects that are continuously mutable and adaptable (hallmarks of the plant and animal kingdoms).

[13] In *The Second Machine Age*, Brynjolfsson and McAfee argue that computers are so dexterous that it is virtually impossible to predict what applications they may be used for in just a few years. Artificial intelligence (AI) is all around us, from self-driving cars and drones to virtual assistants and translation software. This is transforming our lives. AI has made impressive progress, driven by exponential increases in computing power and by the availability of vast amounts of data, from software used to discover new drugs to algorithms that predict our cultural interests. Many of these algorithms learn from the "bread crumb" trails of data that we leave in the digital world. This results in new types of "machine learning" and automated discovery that enables "intelligent" robots and computers to self-programme and find optimal solutions from first principles.

[14] Applications such as Apple's Siri provide a glimpse of the power of one subset of the rapidly advancing AI field — so-called intelligent assistants. Only two years ago, intelligent personal assistants were starting to emerge. Today, voice recognition and artificial intelligence are progressing so quickly that talking to computers will soon become the norm, creating what some technologists call ambient computing, in which robotic personal assistants are constantly available to take notes and respond to user queries. Our devices will become an increasing part of our personal ecosystem, listening to us, anticipating our needs, and helping us when required — even if not asked.

Inequality as a systemic challenge

[15] The fourth industrial revolution will generate great benefits and big challenges in equal measure. A particular concern is exacerbated inequality. The challenges posed by rising inequality are hard to quantify as a great majority of us are consumers and producers, so innovation and disruption will both positively and negatively affect our living standards and welfare.

[16] The consumer seems to be gaining the most. The fourth industrial revolution has made possible new products and services that increase at virtually no cost the efficiency of our personal lives as consumers. Ordering a cab, finding a flight, buying a product, making a payment, listening to music or watching a film— any of these tasks can now be done remotely. The benefits of technology for all of us who consume are incontrovertible. The internet, the smart phone and the thousands of apps are making our lives easier, and— on the whole— more productive. A simple device such as a tablet, which we use for reading, browsing and communicating, possesses the equivalent processing power of 5,000 desktop computers from 30 years ago, while the cost of storing information is approaching zero (storing 1GB costs an average of less than \$0.03 a year -today, compared to more than \$10,000 20 years ago).

[17] The challenges created by the fourth industrial revolution appear to be mostly on the supply side— in the world of work and production. Over the past few years, an overwhelming majority of the most developed countries and also some fast-growing economies such as China have experienced a significant decline in the share of labour as a percentage of GDP. Half of this drop is due to the fall in the relative price of investment goods, itself driven by the progress of innovation (which compels companies to substitute labour for capital). As a result, the great beneficiaries of the fourth industrial revolution are the providers of intellectual or physical capital— the innovators, the investors, and the shareholders, which explains the rising gap in wealth between those who depend on their labour and those who own capital. It also accounts for the disillusionment among so many workers, convinced that their real income may not increase over their lifetime and that their children may not have a better life than theirs.

[18] Rising inequality and growing concerns about unfairness present such a significant challenge that I will devote a section to this in Chapter Three. The concentration of benefits and value in just a small percentage of people is also exacerbated by the so-called platform effect, in which digitally-driven organizations create networks that match buyers and sellers of a wide variety of products and services and thereby enjoy increasing returns to scale. The consequence of the platform effect is a concentration of few but powerful platforms which dominate their markets. The benefits are obvious, particularly to consumers: higher value, more convenience and lower costs. Yet so too are the societal risks. To prevent the concentration of value and power in just a few hands, we have to find ways to balance the benefits and risks of digital platforms (including industry platforms) by ensuring openness and opportunities for collaborative innovation.

[19] These are all fundamental changes affecting our economic, social and political systems which are difficult to undo, even if the process of globalization itself were to somehow be reversed. The question for all industries and companies, without exception, is no longer “Am I going to be disrupted?” but “When is disruption coming, what form will it take and how will it affect me and my organization?” The reality of disruption and the inevitability of the impact it will have on us does not mean that we are powerless in face of it. It is our responsibility to ensure that we establish a set of common values to drive policy choices and to enact the changes that will make the fourth industrial revolution an opportunity for all.

Then They Came for the Lawyers

Ryan Avent

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Technology has already driven blue-collar workers into the underclass. Professionals may be next.

[1] Strange though it may sound, there was a time when manufacturing work resembled professional work today. In the 18th century, on the cusp of the Industrial Revolution, life wasn't bad for skilled tradespeople, who enjoyed a remarkable level of freedom and flexibility in performing their work. They represented a relatively well-off, aspirational class.

[2] Then came the machines. The mechanization of manufacturing transformed industrial work. Because the new machines cost lots of money, bosses kept a close eye on workers to make sure they were doing their jobs and taking good care of the equipment. Over time, this monitoring allowed industrialists to rejigger production in efficiency-enhancing ways. Where manufacturing work was once something of an art that relied on knowledge built up through apprenticeship and experience, it became a highly scripted slog, broken down into repetitive tasks. Anyone could do it, and so the special status and relatively high wages once enjoyed by manufacturing workers disappeared. Laborers became mere extensions of the machines, handling tasks the machines could not— until, eventually, they could.

[3] Across advanced economies, the professional class — white-collar workers in business management, technology, law, finance, and medicine — has largely escaped the ill effects of the recent changes, including rapid globalization and automation. Those changes have disproportionately hurt workers engaged in routine sorts of tasks— running machines on factory floors or carrying out back-office jobs — and those without a college (or especially a graduate) degree. Conventional wisdom long held that this immunity was likely to continue. A paper published by Carl Benedikt Frey and Michael A. Osborne in 2013, which famously estimated that 47 percent of job categories would be vulnerable to automation in coming decades, ranked positions such as manager, engineer, and lawyer among those at lowest risk of displacement.

[4] But the forecast for highly skilled workers is starting to look less sunny. The professional world is about to be transformed by artificial intelligence. As that process unfolds, it could reshape white-collar work much as industrialization transformed manufacturing. Anyone who has ever interacted with companies such as Amazon, Google, and Facebook is already familiar with AI, whether they know it or not. Every time we like a friend's photograph, send an email, or search for a good nearby restaurant, we provide massive amounts of data to those firms. The tech giants use that data to train machine-learning programs to provide us a more customized experience. That process, in turn, allows the firms to sell us more stuff or to sell more advertisements to others who want to sell us more stuff. But the same techniques that generate the ads that follow us around the web are increasingly finding their way into the workplace, as Ajay Agrawal, Joshua Gans, and Avi Goldfarb write in their new book, *Prediction Machines*. Many firms already rely on AI to help them assess business risks (to tell banks which borrowers are most likely to default, for instance) or anticipate consumer demand. And new applications are appearing all the time. Employers already amass piles of human resources data on their workers: the roles they have held in the company, for instance, and the way both they and colleagues around them performed in each.

[5] Machines that are fed that information on a large scale can divine what sorts of worker characteristics are most associated with high team performance— and, therefore, which job applicants are most likely to thrive within the company. By chewing on reams of detailed career histories, machine-learning programs can predict whether a worker on a particular career arc should be promoted or directed toward the exit— or whether a valued employee is about to quit. They can be given sales data and asked to predict which accounts can be made to generate more business and which are dead ends. Yet this is only a start. According to Agrawal, Gans, and Goldfarb, machine prediction will get steadily better and vastly cheaper. Those advances will give companies incentives to more aggressively find ways to deploy AI— and more concertedly collect information on their employees to feed into those systems. The result will likely be much closer monitoring of workers of all sorts.

[6] As consumers, we have grown accustomed to being constantly observed by Silicon Valley. Our GPS-enabled phones keep tabs on every place we go, and the apps we use register our every communication and online purchase. But the same constant background tracking we tolerate as the price of a modern digital existence will soon follow professionals into their offices. Companies can be expected to more closely monitor their high-value workers, as well as their digital communications. AI promises to make profitable use of the information companies already collect from workers' email and internal office messages. Business processes not conducted in digital formats will be pushed in that direction, the better to mine them for data. That includes even physical movements and interactions within the office— perhaps subtly at first, through the tracking of key fobs, for instance, but more overtly as the value of such data demonstrates itself.

[7] Though creepy, this intrusiveness may yield important benefits for workers themselves. If too much overwork— or even simply too much sitting— reduces productivity, the machines could perceive it. Algorithms could pick up risk factors for harassment and abuse or detect biases in a company’s hiring and promotion practices. Systematic analysis of performance should help weed out those skilled at free-riding on others and could nip the Peter Principle— whereby workers tend to be promoted past the level of their competence— in the bud. AI analyses will prod companies to abandon bureaucratic practices that do not actually improve workers’ performance.

[8] The better companies become at understanding what their employees are doing, the more interested they will be in applying lessons. Digital assistants— picture the workplace equivalent of Amazon’s Alexa— might initially offer suggestions to workers: background reading relevant to a worker’s task, for example, or suggested edits to shared documents. But over time, digital guidance will apply to a greater share of professional work and will become more insistent.

[9] Just as assembly lines transformed artisanal work into a series of rote tasks, the AI revolution will allow companies to analyze and deconstruct white-collar work into simpler, more efficient pieces. The discretion workers now enjoy to decide when and how to meet with clients, brainstorm with colleagues, or manage employees will erode, first as companies push for increased structure in such settings to gather better data and then as AI analyses begin specifying how often to schedule client interactions and what form they should take, how best to run a meeting, and how to match workers with tasks. This process, once begun, will take on a life of its own, much as the mechanization of industry did. The more systematized office work becomes, the more opportunities there will be to gather data and further hone what was once an amorphous, freewheeling, high-status business.

[10] White-collar jobs will then bifurcate into a smaller, better-compensated group of elite professionals and managers who oversee the deployment of new technologies and a larger, less differentiated professional class. Good jobs in finance that now require the flexibility to shift among different sorts of tasks— from interacting with clients to building statistical analyses to writing reports and presenting ideas to managers— will become less cognitively demanding and less exclusive as AI takes over some tasks and sets detailed guidelines for others. Those a rung or two up the ladder, overseeing how new technologies are used or faced with complex judgment calls too tricky to be put to an AI, will find their skills in high demand and will be able to bargain for an outsize share of the profits generated by this transformation. Not all professions will be affected equally. Fields such as law and medicine, which are more highly regulated and protected by powerful professional organizations, may be slower to change. But the pressure to keep down costs, and to limit liability risks, will help push the use of AI in such places.

[11] Less fortunate professionals, like the once-proud craftsmen and women of the 18th century, will find their jobs less cognitively and financially rewarding. They will become human cogs in a broader machine— like the dismal laborers on assembly lines repeatedly affixing the same part to the same place on car after car after car. This shift will come as a shock to many professionals, for whom technology has up until now been an empowering force. Past innovations, from database and statistical software to email and cloud computing, helped eliminate tedium and annoyance from professional lives, leaving such workers better able to do the more interesting and challenging parts of their jobs. Now, the good bits of such work, including broad strategic thinking and interacting with others, will be made more tedious so as to raise productivity and cut costs. White-collar workers who might previously have scoffed at the utility of trade unions or fundamental critiques of capitalism may change their tunes.

[12] The most intriguing consequences, however, will be political. The mechanization of industry took a class of fairly content *petits bourgeois*, who had served as a source of political stability, and turned them into a class of machine-smashing radicals: the source material for trade unions and revolutionary political parties. Professionals, similarly, have been a bulwark against economic radicalism in recent decades— none too fussy so long as stock and home prices keep moving upward and politics remain relatively predictable. Should the spread of AI deprive them of their autonomy, and of what many of us see as a basic right to job security and growing incomes, the political world could be turned on its head. That is something to consider the next time you ask Alexa to order more dog food. Before long, it will join you at the office. And before you know it, the antics of the Luddites, who smashed mechanized weaving machines in a futile effort to save their livelihoods, may not seem so foolish after all.
