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# Book review

### Digital revolution: its impacts on society and economy

I am reviewing two books written on the issues of information and computer technology, with especial emphasis on understanding and explaining the impacts on modern economy and society. These books are:

*Book 1*

Title: *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy* (Kindle edition).

    Authors: Erik Brynjolfsson and Andrew McAfee.

    File size: 517 KB (print length – 74 pp.).

    Publisher: Digital Frontier Press (October 17, 2011).

    Sold by: Amazon Digital Services, Inc.

    ASIN: B005WTR4ZI.

*Book 2*

Title: *The New Digital Age: Reshaping the Future of People, Nations and Business* (Kindle edition).

    Authors: Eric Schmidt and Jared Cohen.

    File size: 1268 KB (Print length – 337 pp.).

    Page numbers source ISBN: 0307957136.

    Publisher: Knopf (April 23, 2013).

    Sold by: Random House Digital, Inc.

    ASIN: B00ALBR2N6.

The details of the books and the introduction of the authors are given in the book description tab of the Kindle books.

The first book, *Race Against the Machine*, is written by two academics associated with MIT's Sloan Business School. The first author (Erik Brynjolfsson) is a professor, director of MIT's Center for Digital Business and also the chair of *Sloan Management Review*. The second author (Andrew McAfee) is a researcher at the center and also a prolific writer. The focus of their book is explaining the impact of digital technology on "jobs, skills wages and economy" (Chapter 1). This book endeavors to provide conceptual clarity on the relationship between technology and economy (especially employment).

The second book, *The New Digital Age*, is written by two practitioners associated with Google. The first author, Eric Schmidt, currently the Chairman of Google, is a well-known name that requires no further introduction. The second author, Jared Cohen, is a former diplomat and is currently the director of Google Idea, which has been described as Google's internal think tank in *The Economist* (2013b). They describe the internet as the "largest experiment involving anarchy", and the focus of the book is on its impact on "identity, relationships and security" issues ("Introduction"). Of course, they are the prime players as well as having ringside seats to watch the game of internet as it unfolds.

They have also used their access to the thoughts of technology, business and political leaders to complement, validate and sometimes supplement their own experiences.

Both of these books are very timely and complement each other.

*Race Against the Machine* is written with the explicit intention of bringing "technology" into the discussion of economy and employment (Chapter 1), on which it is superbly successful. The proportion of people engaged in employment in America is at an all-time low. It is 58 percent now, compared to the historic average of 64 percent (Chapter 3). Chapter 1 briefly discusses the suggested reasons for this phenomena. The first of the arguments points to the unprecedented deep recession the country has gone through and suggests getting employment rates back to the historical level will take some time. The second argument points towards the structural changes where America's edge in innovation has eroded and, consequently, its ability to create new jobs has diminished, making the high employment rate permanent. The third argument this book puts forth agrees that there is a structural change. But, unlike the second argument, this book argues that the cause of high unemployment is the growing pace of technological innovations. Man, at the moment, is losing his "race against the machine". Hence, the growth is mostly jobless. This is called the "end of work" argument.

Chapter 2 is the most important chapter of this book. It elaborates on how the pace of technological innovation is increasing. To illustrate, it references a historical incident regarding the invention of the chess board. The inventor was brought before the King and the King asked him to choose his own reward. The inventor asked the King to place one grain of rice in the first square, and twice that in the second and again doubling in the third and so on. Thinking that it would be a small gift, the king agreed. It was small in the beginning, but by the time it reached 32nd square, the total amount of rice grew very large, the equivalent to what could be grown in a whole field. What is more, after that the amount started growing even faster. Very quickly, the reward was beyond the means of the King.

There is a well-known rule of thumb regarding computers attributed to Gordon Moore, one of the founders of Intel. It states that computing power doubles every 18 months. Since the first investment in computers made in 1958, we have about crossed 32 periods of 18 months. So, computer technology has arrived at the second half of the chess board. Not surprisingly we see Google's driverless cars, IBM's "Watson" beating Ken Jennings in Jeopardy, and IBM's "GeoFluent" translating online messages from one language to another almost flawlessly. It has been a while since IBM's "Deep Blue" beat Kasparov in chess. These are technological marvels, not examples of America losing its technological edge, but they are not job creators either. In fact technologies like these tend to take jobs away from people. Still, we are just at the beginning of the second half of the chessboard.

Chapter 3 presents statistics to support the "end of work" argument. Most jobs belonging to the middle class are being lost. Therefore, while the GDP per person has steadily increased in America, the median income has fallen. For example, all of the increases in wealth from 1983 to 2009 have gone to the top 20 percent households. They call it the economy of "accelerating technology and disappearing jobs". While technology can improve the overall economy, it is not necessary that it improves the economy of most (or even the majority) of the people. This is a kind of "winner-takes-all economy" where the highly skilled are beating the lower skilled ones. Superstars rake in most of the benefits and capital is benefiting while labor is losing. Look at the soaring

share prices, while employment opportunities are not increasing, to understand the meaning of these statements.

Between Chapters 2 and 3, the book explains the role of new technology in replacing labor with machines. So, the immediate impact of the new technology is felt in the increasing unemployment rate. That happened with the introduction of the loom and with the steam engine. However, there is also another aspect of technology, such as electricity or computing/information technology, called general purpose technology, where applications of these technologies have the potential to create enormous employment and wealth. In order to create jobs, mankind has to learn to work with the machine (not compete against it) and use the combined strength to grow the economy as a whole. So, the current state of the high unemployment rate means that we are in the midst of a transition to the digital age, which has the potential to bring enormous wealth and prosperity.

The book warns that even though it may be transitional, the current state of high unemployment and lopsided distribution of wealth may not be sustainable. It may cause the economy to slow down (because high unemployment may mean lower level of consumption and economic activities) or even lead to political or social instability. For these reasons, the book, in Chapter 4, suggests changes in education, employment and industrial policies and practices in order to increase employment opportunities and unleash entrepreneurial potential afforded by digital and communication technologies.

All in all, this is a small but ambitious book. Looking at it, we can see that the authors want to influence future discussions on technology and employment issues. They have succeeded in this quest, as well. For example, a recent article in *The Economist* (2013a) on employment and the economy gave the view of these authors a prominent space.

The second book I am reviewing, *The New Digital Age*, focuses on the internet and does not discuss economy and employment directly. It also does not care to provide a conceptual framework like academicians in the previous one have done. This is a big book covering a wide range of topics. It is a very balanced book in the sense that it does not put undue emphasis on the positive side of the internet, nor does it paint the internet as all bad. In each of the topics it discusses, it weighs both sides very carefully.

This book starts its introduction by characterizing the internet as a human creation which is yet to be truly (fully) understood and is growing very fast in scope and reach. For example, there are currently two billion internet users and five billion mobile phone users, making people connected to the internet (one way or the other) equal to the total human population (although there could be double counting. Some people are in Facebook and also have mobile phones for example). And, this population is growing every minute. This book focuses its discussions on identity, relationships and security in the context of the internet. Overall, this book complements the first one (*Race Against the Machine*) very well.

Chapter 1, whose topic is our own "future selves", discusses the wide ranging changes that connectivity has brought (or will bring). Connectivity has brought enormous benefits, especially the advent of the mobile phone which has improved lives (in the third world) enormously. For example, Maasai cattle herders in the Serengeti can use their mobile phones to get the latest market price of their products and they can also get timely (crowd sourced) information if predators are lurking nearby. This is just one example. Similar stories can be found all over the world.

The book discusses topics like 3D printers, the possibility of integrated washing machines (which not only wash and dry but also fold and iron clothes), driverless cars, data accessibility and improved healthcare management, etc. to show how our lives will be enriched and comfortable with the use of these available technologies. But it also warns that while everyone can benefit from the new technology, the benefits will not be equal.

Chapter 2 is on issues relating to identity. People's virtual identities are extensions of their real (offline) ones. But with the increasing clout and reach of the virtual one, people's (offline) personalities will be increasingly dictated by their online reputations. What is more, in the future your different activities taking place in isolated places will be connected. Think what happens if your Facebook entry is connected to your tax return and also your flight itinerary. And, it is open for everyone to see.

The authors point out that the biggest threat to privacy will come from the use of biometrics. You will be identified wherever you go.

Therefore, privacy and security will be a very important issue for everyone. Individuals will be very concerned. Governments will feel pressured to make laws to protect their citizens' identities. NGOs and lawyers will get involved. Businesses that provide more services like online data security, reputation management and insurance, will also be big players.

All this will impact lives everywhere. But, types of impact will be different depending on the society in which you live. In open societies, online crowds can sway many decisions, which is not necessarily good. But, it may also become very difficult to hide scandals, corruption and unethical behaviors, which could be good. However, undemocratic governments may use this total access to individual activities as a tool to impose total control on individual lives.

The next chapter (i.e. Chapter 3), deals with "The future of the states". Most people, the authors point out, think of the internet as a "lawless" place beyond the reach of states, where people can be free to express themselves. That can only be partially true (at best). The internet needs a physical presence in the form of servers and ISP providers, for example. Governments have jurisdiction over these entities and they have used them to restrict the freedoms in the internet.

For example, the Chinese Government uses its jurisdiction to deny people access to whole web sites such as Facebook and YouTube. Second, they also hire legions of workers to scour through the allowed sites to look for offensive postings, and there are many people whose job it is to post government propaganda masquerading as public opinion. Not just the Chinese Government, but the Turkish Government, a Western ally, also filters content accessible to the Turkish population. Even so-called democratic governments like those of Malaysia or even Germany have some sort of censorship in the internet.

With its own versions of Google and Amazon, like Baidu and Alibaba, plus the firewalls and other legal and business tactics, China could be creating its own version of the internet. The authors think that Russian and Arabic internet platforms could grow in time, as well. So the internet, rather than being one worldwide platform accessible to everyone, could end up disintegrated into various platforms (although there will be overlaps and porous borders), broadly reflecting the cultural and political rivalries of the physical world.

The next chapter (Chapter 4) is on revolution. The Arab Spring showed the potency of the internet, especially sites such as Facebook or Twitter, to spread the message and create a critical mass required for successful demonstrations. But leadership credentials come from hard work and experience. The authors observe that leaderless

revolutions like the Arab Spring, with their inability to usher the movements to logical conclusions, showed their limits.

The next two chapters deal with the role of internet in terrorism (Chapter 4) and conflict and combat (Chapter 5), respectively. Great harm can be caused by breaking into someone's secured site to steal secrets and/or money or deny legitimate services. internet viruses and worms are created to disrupt targeted operations. Further, the internet can (potentially) be used to bring down physical infrastructures such as electricity or disrupt airport operations. Cyberspace could very well be the fifth domain of defense activities (along with land, air, sea and space). Codes could also be weapons of future wars, as well as instruments for peacekeeping operations. And countries like Estonia, Finland, Norway, and Chile could contribute to peacekeeping efforts in the future on the strength of their code writing capabilities.

Chapter 6 goes on to describe how the internet can be an instrument of reconstruction. In every reconstruction, be it war-ravaged Afghanistan or Iraq, or those afflicted by natural disasters like Haiti and tsunami-affected Indonesia, the first infrastructure to be established (or reestablished) was the internet (and mobile phone) lines. This enabled volunteers to reach out to the victims, as well as provided an infrastructure for the government to assert control, communicate and coordinate.

The last chapter concludes the book on a positive note. We are in an exciting time; the internet is growing at an exponential rate. However, it dismisses any notion that the virtual world will overpass the physical one. The internet will only make citizens more powerful if we can use our "intelligence for judgment, intuition, nuance and interactions" with computer's "infinite memory". This is the very conclusion of the first book, but reached from quite a different path.

*The Economist's* (2013b) reviewer thinks this book betrays the "usual arrogance" of "Silicon Valley". I would not go that far. But I was bothered when I saw that in the end customers (individuals who surrender every piece of their privacy with every click, posting and transaction) were not given due consideration. For example, in Chapter 2, when they discussed privacy issues, they admonished customers to read privacy statements carefully before agreeing (Is that a real choice for any one?). At the same time, they suggested that internet companies should hire more lawyers to defend themselves. That is very lopsided to say the least. I would have loved to see tangible and relevant consideration for normal people's concerns.

Overall, I liked both of these books and recommend them to all professionals, academicians and students. Since the first book (*Race Against the Machine*) directly addresses the issues of employment and suggests the skills required for mankind to work together with machines, it could be very relevant to policy makers, as well as students who want to position themselves to benefit from the rising tide of technology.

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