Richard Baldwin: The Globotics Upheaval: Globalisation, Robotics, and the Future of Work.

1st edition. London: Weidenfeld & Nicolson, 2019, 292 pages, ISBN 978-1-4746-0901-2.

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DOI: https://doi.org/10.32422/mv.1695.

Meet Amelia. She works at the online and phone-in help desk at the Swedish bank SEB. As one might expect, she is blond and blue-eyed, and she has a confident bearing softened by a slightly self-conscious smile. Interestingly, Amelia also works in London for the Borough of Enfield, and in Zurich for UBS. Actually, she works for more than twenty of the world's leading banks, insurers, telecom providers, media companies, and health care firms. Oh, and by the way, Amelia can learn a three-hundred-page manual in thirty seconds, can speak twenty languages and can handle thousands of calls simultaneously. Amelia is a "white-collar robot", essentially a piece of software, which, according to Richard Baldwin, will radically transform our (global) economy.

Richard Baldwin is a professor of international economics at the Graduate Institute of International and Development Studies and over the past thirty years he has written extensively on topics related to globalization, international trade, economic geography and development. His book *The Great Convergence: Information Technology and the New Globalization* (2016) was listed among the best books of 2016 by *The Financial Times* and *The Economist*. Baldwin also worked as an economist at the Council of Economic Advisors to President George Bush and he is the founder of VoxEU.org.

Baldwin's last book *The Globotics Upheaval: Globalisation, Robotics and the Future of Work* (2019) focuses on digital technology, telemigration and automation and their effects on work and (global) economy. The main idea of the book can be summarized as follows: A new form of globalization is taking place, namely telemigration, which allows hiring people on the other side of the planet, who can work from their homes and are willing to work for much smaller salaries than their domestic counterparts. Baldwin calls them "remote intelligence" (RI). In addition, the enormous progress in digital technologies, automation and robotics leads to a massive employment of "artificial intelligence" (AI). This combination of RI and AI, or, in other words, the combination of globalization and robotics – globotics – is something qualitatively new. While automation and globalization themselves are nothing particularly new, their combination, globotics, is different for at least three reasons: it is coming inhumanly fast, it will seem unbelievably unfair and it will mostly affect people working in the service sector, who have so far been sheltered from the effects of globalization and automation. And as Baldwin points out, these people are not ready for it.

What may seem as an alarmist call is actually anything but. Baldwin is optimistic about the future (perhaps even too optimistic) and according to his view, service sector automation and telemigration are inevitable and even welcome in the long run. What he is concerned about is the transformation period. As he says: *"When millions of jobs are displaced and communities are disrupted, we won't see a stay-calm-and-carry-on attitude"* (p. 8).

The book starts with a quick overview of the main argument. The first 16 pages (Introduction), therefore, give the reader the general understanding of the issue and outline

Baldwin's argumentation. If you just want to get the main message of the book in a condensed form, this is the part you should read.

The following first part of the book consists of chapters two and three and looks at history. The first chapter discusses the Great Transformation (roughly from the 18th to the 19th century) and the second chapter the Services Transformation (starting in the last third of the 20th century). Baldwin analyses them through a perspective according to which a technological impulse launches a four-step process of 1) transformation, 2) upheaval, 3) backlash, and 4) resolution. For instance, the Great Transformation was enabled by steam power, which ultimately led to a shift of workers from agriculture to manufacturing. It also produced a backlash in the forms of fascism, communism and "New Deal"-like social welfare programmes. Once these governmental programmes were introduced, the Great Transformation started to be a great thing for the majority of people and the income inequality declined. The starting input for the Services Transformation was the miniaturization of computers, and the following ICT revolution led to the deindustrialization of the advanced economies and a shift of workers from manufactures to offices. However, deindustrialization has destroyed communities and people started reacting not as individuals but rather as members of threatened communities. There has not been a big backlash to this as in the case of the Great Transformation, although smaller backlashes appeared. Baldwin mentions the election of Donald Trump and the Brexit victory as examples and he warns that these 2016 backlashes did not produce a resolution and we do not yet know where the anger is heading.

Even though these two chapters are insightful and perhaps help to illustrate the processes of large-scale economic transformations, they are not truly linked to the main focus of the book. The main purpose of these chapters could have been fulfilled in a much more concise form (it accounts for 70 pages from the total of 276), especially given Baldwin's ability to summarize a great variety of information. Furthermore, Baldwin presented a much more detailed analysis of these events in his *The Great Convergence* and could have simply referred to it instead of repeating similar information here.

The second part of the book contains seven chapters (chapters four through ten of the book) which deal with the Globotics Transformation. The fourth chapter focuses on the digital technology driving the Globotics Transformation. Baldwin first discusses the massive improvement of computer processing speed[1] and then introduces four "laws" that explain the nature of the new digital technology. Moore's law says that computer processing speed grows exponentially, doubling every 18 months or so. Gilder's law predicts that data transmission rates would grow three times faster than computer power. Metcalf's law claims that being connected to a network gets more valuable as the network grows, even as the cost of joining falls. Finally, Varian's law says that since digital components are free and digital products are highly valuable, innovation explodes as people try to get rich by combining the components in search of valuable products. With the help of these "laws", Baldwin presents the technological impulse that started the four-step process of the Globotics Transformation described above. Moreover, Baldwin mentions some curiosities and interesting details about the digital technology, which provide a better understanding of the impact of the digital technology and the digital world we live in.[2]

The fifth chapter deals with telemigration as being one of the aspects of the Globotics Transformation. Telemigration will effectively bring a wage competition from international workers to domestic markets. From the perspective of the advanced economies, the RI is ready to work for a lower amount of money (see Table 1) and since the type of work, which is easily transferable, is usually office type work, the RI will compete with the service workers, who simply cannot afford to earn the low amount the RI is happy to earn. Telemigration is not a new phenomenon; however, thus far it was significantly

limited mostly due to the language barrier as every successful telemigrant had to have "good enough" English. Nevertheless, with the massive advance of machine translation, there are millions of people who have "good enough" English and although the quality of their work may not be as high as that of the domestic office workers, they are significantly cheaper and that is often decisive. This is why there has been a boom in recent years of various freelancer platforms and Baldwin presents several examples of companies like American Express, Dell, Xerox, CBS Radio, Oracle and Hilton offshoring significant amounts of office jobs to telemigrants. In addition, new types of technologies such as augmented reality, telepresence robots and holographic presence make it easier for telemigrants to do their job. It may seem like a sci-fi movie, but these technologies are already used quite extensively. For instance, Baldwin mentions the prime minister of India, Narendra Modi, who used holographic presence in 2014 to be at far more campaign rallies than he could have otherwise attended in person.

Table 1
Net Monthly Income, in 2005 US Dollars (source: Baldwin, 2019, p. 117).

	Accountant	Computer programmer	Engineer	Professional nurse
US	3,370	4,141	4,710	3,168
UK	3,867	3,476	4,225	2,782
Poland	617	892	664	563
China	165	252	252	187

The sixth chapter focuses on automation and white-collar robots like the above-introduced Amelia. Baldwin presents many of these robots and discusses all the things they can do and what they are good at. Baldwin's main point here is that these white-collar robots will eliminate many jobs but few occupations, just like a tractor, for instance, eliminated many jobs in agriculture but did not eliminate the occupation of farmer itself. Baldwin then presents some studies and predictions about the number and nature of the jobs which will be replaced by AI. He states: *"Over the next few years, the number of jobs displaced by white-collar robots will be somewhere between big and enormous. 'Big' means one in every ten jobs is automated; 'enormous' dials that up to six out of ten"* (p. 161). The sectors most threatened by AI are office and administration, retail, construction jobs, food preparation, transportation, medical jobs, pharmacies, journalism, legal works, and finances. However, there will be some new jobs created by the digital technology, and new and better jobs that do not exist today will emerge. In the long run, Baldwin claims, we will all be better off. The thing we should worry about is the transformation period.

The seventh chapter presents the factors that are moving the transformation step of the Globotics Transformation to the upheaval step. As mentioned above, the Globotics Transformation is coming inhumanly fast (Baldwin even tries to explain why our brains are not capable of fully apprehending the speed of the change) and it will seem unbelievably unfair. Furthermore, the job displacement will infiltrate our societies in a similar way as the smartphones did. Baldwin writes: *"[Smartphones] snuck into our daily routines without us realizing how much they were changing our lives because the advantages seduced us little by little"* (p. 196). The same thing will happen with the

Globotics Transformation and it is reasonable to expect that there will be a backlash of a certain sort because the governments *"are either unaware of how fast the changes are coming or [are] living in denial about their implications for middle-class prosperity"* (p. 208).

The eighth chapter discusses the possible forms and shapes the backlash can take. Baldwin is sceptical that the backlash would be a violent one. It will most likely be some sort of shelterism; in other words, the groups and communities most affected by the Globotics Transformation will try to convince their governments to protect their jobs and shelter them from the RI and AI competition. Such shelterism and reactionary regulation may slow down the changes; however, Baldwin notes that *"things could get out of hand if globots cast hundreds of millions of lives into disarray"* (p. 232). Moreover, reactionary regulation and even a possible violent uprising can slow down the trend, but they will not postpone it indefinitely.

The ninth chapter focuses on the resolution and on what the future will look like. Based on the analysis of RI and AI in the previous chapters, Baldwin concludes that the new form of globalization will – perhaps paradoxically – bring a future that will be more local and more human. In other words, we will have jobs that cannot be telemigrated and that robots will be bad at, which basically means all the types of jobs that need social intelligence, creativity, innovations, personal contacts, "thinking outside of the box", etc. Finally, the tenth chapter offers some recommendations about how to prepare for such a future. First, Baldwin claims that we should not seek jobs that directly compete with RI and AI. These jobs will most likely be telemigrated or done by robots. Second, we should invest in developing soft skills like being able to work in a group, and being creative, socially aware, empathic and ethical. Third, we should realize that humanity is an edge, not a handicap. Baldwin concludes: *"In the future, having a good heart may be as important to economic success as having a good head was in the twentieth century, and a strong hand was in the nineteenth century"* (p. 268).

One of the best aspects of the book is that it is very well-written and easily understandable although it deals with the rather difficult topic of digital technology. This is not a book for IT experts only; it was clearly written for a broader audience. Baldwin makes a joke here and there, refers to pop culture and, in one case, even quotes a *Game of Thrones* character. The book excels in connecting the microlevel – such as concrete technologies, individual companies, and workers – with the macrolevel, such as processes of globalization, labour offshoring and possible responses from governments. The only aspect I find a bit bothersome is that Baldwin repeats the main arguments quite often throughout the book, and it may be tedious from the reader's point of view. Furthermore, the author only looks at the Globotics Transformation from the perspective of the advanced Western economies. For instance, telemigration will certainly have different effects on the Western economies and on those economies that will supply telemigrants; however, Baldwin only discusses the former. I understand that this was Baldwin's choice; however, it would be interesting to analyse the situation also from the perspective of the developing world and perhaps even from a more global political/economic perspective. Finally, although Baldwin's optimism about the future is contagious, maybe he is too optimistic and overlooks all the things that could go wrong. Perhaps Baldwin is right and in the long run, we will all be better off. But as John Maynard Keynes famously said, in the long run, we are all dead.

To conclude, Richard Baldwin's *The Globotics Upheaval: Globalisation, Robotics and the Future of Work* is a well-written book about a very important topic which provides a valuable insight into the new digital economy. Everyone dealing with globalization, technology, economic organization of society and migration of labour will find useful information in it. Most of all, I would especially recommend this book to policymakers,

who will have to deal with the Globotics Transformation and its consequences in the upcoming years.

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[1] Baldwin gives the example of the iPhone 6s, which was released in 2015, and which processes information about 120 million times faster than the mainframe computer that, in 1969, guided Apollo 11 to the moon. However, the iPhone X, which was released in 2017, is about three times faster than the iPhone 6s. In other words, the increment in processing speed between 2015 and 2017 was 240 million times the speed of the Apollo 11 computer.

[2] For example, Baldwin discusses the amount of data being transmitted online: *"In a single typical minute of 2017, a half million Tweets were sent, over four million YouTube videos were watched, 47 million Instagram posts and 4 million Facebook likes went up, and 15 million text messages were sent. […] Cisco estimates that global internet traffic was 1.2 zettabytes in 2016"* (p. 95). He then states that storing all the catalogued books in the world in all languages would fill about 480 million million (this is not a typo) bytes, which would fit onto about 20 thousand DVDs. If we stacked all these DVDs, we would get a pile that would be about 24 meters high. Storing 2016's internet traffic on DVDs would produce a pile which would be 24 billion kilometres high. It would reach from the earth to the sun and back 80 times.

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