Labor market trends of the future

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Abstract

The development of machines and algorithms launched a new industrial revolution that is taking place today. However, there are concerns that society will adapt to this process slower than it did to the previous industrial revolutions or even may not be able to adapt at all. The reason of these assumptions is the exponential acceleration of development. The process could bring serious changes to the labor market. On the one hand we can expect that some professions will cease to exist new ones will come about; on the other hand it can change the distribution of workforce among occupations. The modernization of education could help society to prepare for these changes, but it seems we cannot keep up with this development.

The fourth industrial revolution

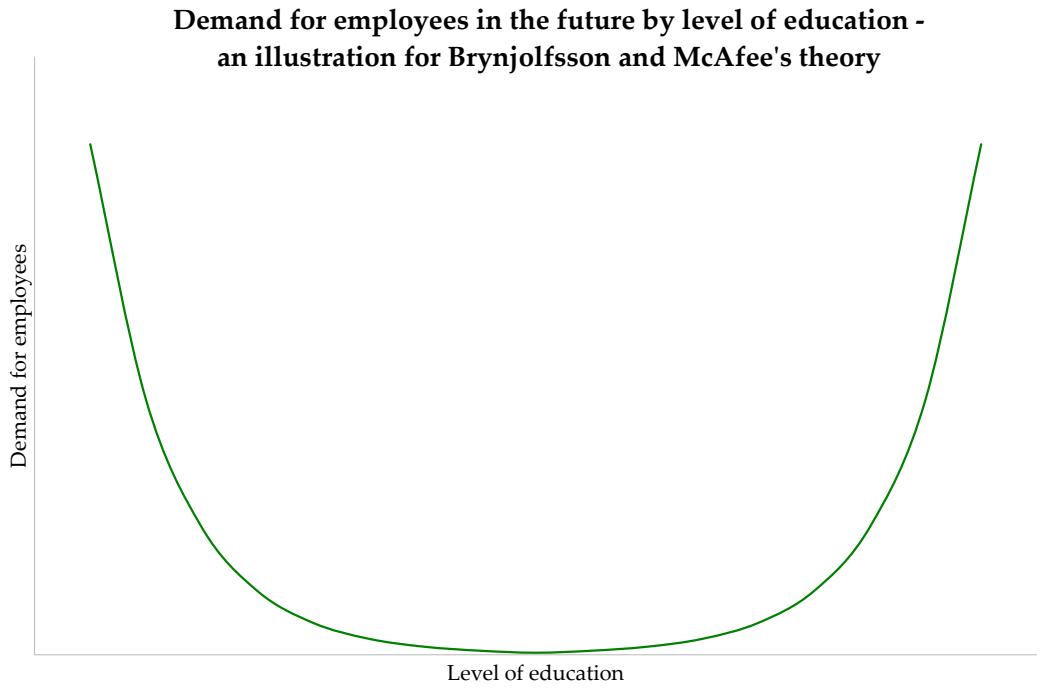
Since March 2016 artificial intelligence can beat humans not only in chess, but also in Go. Again, a period has begun when the development of machines and algorithms cause certain professions or jobs, which had been held irreplaceable, disappear from the labor market. The very quick social and technological changes brought about by the fourth industrial revolution, also referred to as a second machine age, is a serious challenge to socio-economic systems. A good indication of the size of the problem is that nearly half of all professionals with an overview of this area (48%) feel that society will not be able to handle these new challenges. Unlike previous industrial revolutions, the transition is too quick for economic players and legislators to keep up at an appropriate pace. This process may bring about structural and social changes in such scale, that they could define our possibilities for decades.

The impact on economic systems

A number of possibilities and likely outcomes have been thoroughly examined by Andrew McAfee and Erik Brynjolfsson in their book[1]. Their theory concerning labor market changes says that there will be a high demand for low-skilled workers who would fill in low-wage jobs which are not cost effective to mechanize on the one hand. On the other hand, there will be a great demand for highly educated workers whose work is so complex that it cannot be automated or who work in the field of automation itself. The authors conclude that moderately skilled workers will suffer the biggest decline of demand in the labor market.

[1] McAfee – Brynjolfsson (2014): The Second Machine Age (W.W. Norton & Co. Ltd.)

Figure 1: Demand for employees in the future by level of education – an illustration for Brynjolfsson and McAfee's theory



Based on Brynjolfsson-McAfee (2014): The Second Machine Age

Another important change would be that with machines that never get sick, nor take cigarette breaks, do not raise children, and never demand wage increases, a significant growth in productivity can be achieved while reducing production costs. Both quantity and quality of products on the market would improve, which normally increases the general welfare of the society. However, this process would result in the majority of today's workers leaving the labor market, meanwhile non-automated jobs and the mass flow from other segments would exert pressure on wages. The additional revenue resulting from the automation will enrich the possessors of the robots, which is why the social surplus resulting from the conversion would lead to an extremely unequal distribution of wealth within society. This would bring about a reduction in effective demand, which would create a gap between increased productivity and market opportunities.

The authors attempt to summarize the characteristic of the changes in this age in five phenomena:

1. The appearance of new technology skills

Previously – even in 2004 – it was believed that in the near future machines could not replace human employees in areas that require complex communication and sample recognition. However, the appearance of the self driving cars seems to be refuting this.

2. Constantly accelerating technological progress, which is exponential, combinatorial and digitized at the same time

A generalization of Moore's Law states that the value of indicators measuring technological development doubles approximately every 18 months. According to the authors, this acceleration has three main features.

It is exponential, which means that the speed of development grows explosively. It is digital, which enables creation of new sciences and the exploitation of new resources through the acceleration of the flow of information. And finally, the development is combinatorial, which implies the appearance of a new form of innovation – the type that does not require new knowledge, but development is achieved by new combinations of pieces of information that we already have.

3. Separation of productivity and employment

During the past industrial revolutions productivity and employment grew together: unemployment generated by technological progress was soon offset by the creation of new jobs. The current development speed, however, as noted above, means that some groups of the society may not be able to adapt, so this effect may not occur.

4. The development of "winner takes it all" type markets

It is becoming more and more typical on digital markets that the best product, or the one that meets the needs most accurately, obtains the majority of the profit. This helps the formation of oligopolistic and monopolistic market structures that hinder market competition and reduce consumer surplus.

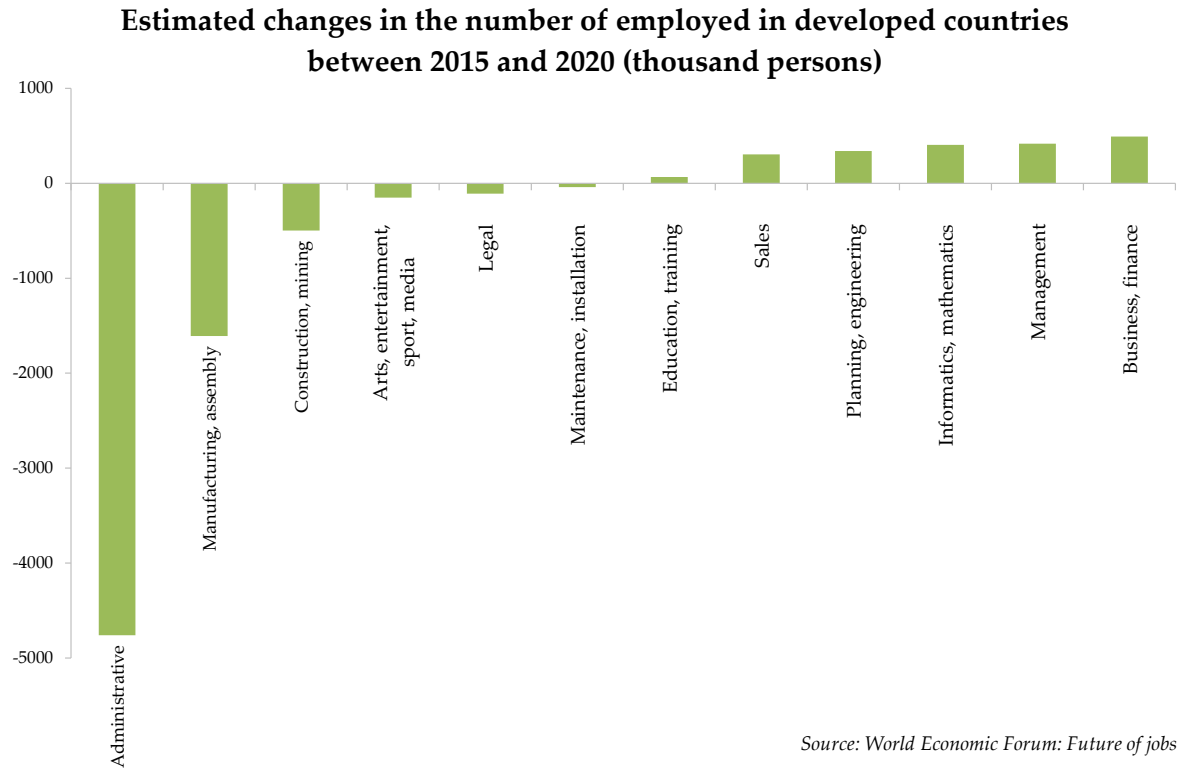
5. Increase and extreme distribution of total assets

Next to the increase of assets and the creation of new values, another important impact of the business-driven automation might be a sharp rise in wealth inequality. Brynjolfsson and McAfee call this a capital-biased technical change in their book. On the other hand, those who can adapt to the quick changes and the digital challenges may make extremely great fortunes. This is called skill-biased technical change.

Restructuring the labor market

According to a research of the World Economic Forum approximately 7.1 million jobs will disappear in the next 5 years from 15 of the world's dominant economies (Australia, Brazil, China, France, Germany, India, Italy, Japan, Mexico, South Africa, Turkey, United Kingdom, United States besides two groups of countries from Southeast Asia and the Arabian Peninsula). It is important to note that robotization, which mainly endangered blue-collar workplaces so far, now also can make the work of white collar workers replaceable. At the same time, 2 million jobs may be created for highly skilled workforce for tasks that cannot be automated.

Figure 2: Estimated changes in the number of employed in developed countries between 2015 and 2020 (thousand persons)



Source: World Economic Forum: Future of jobs

Out of the 7.1 million decrease 4.76 million will affect administrative jobs, while the automation of manufacturing and assembly will also rise quickly (the study estimates a 1.61 million decline of workplaces in this area). Every job that requires driving vehicles is highly endangered. This includes road, air and water transportation of passengers and freight as well as machinery operation. Along with Google and Tesla, Mercedes-Benz is also engaged in serious research about self-driving cars, as a marketing video shows; what is more, a few weeks ago it became known that Uber has joined the ranks of testers for self-driving vehicles as well. In Hungary the jobs of agricultural machine operators and drivers are directly threatened by technology. For example, a GPS-based fleet tracking system is already in use in many places today and from that it is only one more bigger step to change or self-driving tractors and combine harvesters.

In Hungary security guards have the highest headcount-to-population ratio as there are nearly 105 security guards for every 10 000 inhabitants. Their numbers are also significant within the European Union: it is the fifth largest occupational group. However, developments in security technology and smart-homes will lower the needs for their work as well.

The increase in jobs foremost affects business and finance sectors (here 492,000 new jobs are expected), as well as management (with an expected growth of 416,000), as well as the areas of information technology and mathematics (405,000 new jobs forecast).

Although for now the benefits of flexible work hours for white-collar workers and other atypical forms of employment (which are rapidly created by the so-called sharing economy, for example) are more emphasized, it is important to see that a relatively high degree of uncertainty comes with the changes. In addition to the transformation of the types of employment, uncertainty also increases due to the continuous creation of new professions; a significant proportion of current primary school students (according to some estimates up to 65%) will perform jobs that do not even exist today. We can find examples for this also in the currently working generation: nobody knew 15 years ago that there would be a need for social media managers or SEO experts.

Education

In addition to regulations, education is also adapting to the new trends slowly, while the taught materials become obsolete faster and faster. It would be important to put more emphasis on digital education, for the significance of lexical knowledge has been decreasing since practically any information can be easily found on the Internet.

More and more companies have to train the manpower they need themselves. This is partly due to increasingly specific demands, which the educational system cannot keep up with, and partly because even if graduates did get a training in the areas that the company needs, often they do not have the skills required for employment. This trend will most likely continue in the future.

Options

The consequences outlined above must be viewed critically for they are predictions, and uncertainty (partly arising from the development of innovation) is one of the major features of the digital age. However, current trends designate several main directions, which both employers and employees could give more adequate answers to. For example, strengthening digital skills should be considered on both sides; employees should prefer complex and creative professions, while employers, should prepare for the use of automation and for taking advantage of the benefits offered by it.