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Automation, Education, Unemployment: A Scenario Analysis

Automatyzacja, edukacja, bezrobocie.
Analiza scenariuszy

ABSTRACT

The article proposes a short term scenario analysis concerning the possible relations between automation, education, and unemployment. According to the author, the scenario analysis elaborated by the McKinsey Global Institute in 2013 underestimates the problem of technological unemployment and proposes an education model which is inadequate to face the challenges of 21st century disruptive technologies. New technological advances—as the automation of knowledge work—will also affect the jobs of highly educated workers. Therefore, policy makers will not avert the scenario of massive unemployment only by extending the study of math, science, and engineering. A better solution could be the establishment of a universal basic income, and the elaboration of an education model capable of stimulating creativity and the sense of belonging to a community.

ABSTRAKT

Artykuł przedstawia analizę krótkoterminowego scenariusza przyszłości odnośnie do możliwych relacji między automatyzacją, edukacją i bezrobociem. Zdaniem autora, scenariusz przedstawiony przez

KEY WORDS

technological unemployment, automated society, universal basic income, humanities education, social work

SŁOWA KLUCZOWE

bezrobocie spowodowane postępem technologicznym, zautomatyzowane społeczeństwo, bezwarunkowy dochód podstawowy, edukacja humanistyczna, praca socjalna

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McKinsey Global Institute z roku 2013 nie docenia problemu bezrobocia wynikającego z postępu technologicznego i proponuje taki model edukacji, który w sposób nieadekwatny chce stawić czoła wyzwaniom, jakie przynoszą przełomowe technologie XXI wieku. Nowe osiągnięcia technologiczne – jak automatyzacja pracy umysłowej – będą wpływać na zatrudnienie wysoko wykwalifikowanych pracowników. Z tego powodu decydenci nie odwrócą scenariusza masowego bezrobocia wyłącznie dzięki rozbudowywaniu nauczania matematyki, nauki i inżynierii. Lepszym rozwiązaniem mogłoby być ustanowienie bezwarunkowego dochodu podstawowego oraz opracowanie takiego modelu edukacji, który stymulowałby kreatywność i zmysł przynależności do wspólnoty.

The McKinsey scenario

In 2013, the McKinsey Global Institute published a report entitled: *Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy*.¹ It is a picture of the near future based on the analysis of technological trends. According to the report, societies and policy makers need a clear understanding of how technology might shape the global economy and society over the coming decade, in order to deal with risks and opportunities offered by new technologies. Precisely, “they will need to decide how to invest in new forms of education and infrastructure, and figure out how disruptive economic change will affect comparative advantages.”²

In general terms, McKinsey’s scenario is optimistic. It shows that the technologies on their list “have great potential to improve the lives of billions of people.”³ It quantifies the potential economic impact of new technologies on the order of \$14 trillion to \$33 trillion per year in 2025. However, the report is mainly designed to meet the needs of big corporations. New technologies appear to be an opportunity mainly for the owners of capital. Indeed, the report admits that the future may bring also some negative side effects for other social classes. It recognizes that the benefits of technology *may not*

¹ J. Manyika et al., *Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy*, McKinsey Global Institute 2013.

² Ibidem, p. 1.

³ Ibidem, p. 18.

be evenly distributed. That is, “progress” could contribute to widening income inequality, because the automation of knowledge work and advanced robotics could replace the labor of some less skilled workers with machines and, therefore, create disproportionate opportunities for capitalists and highly skilled workers.⁴ In other words, disruptive technologies may generate “technological unemployment,” opening the door to a scenario in which the rich get richer and the poor get poorer.

This admission does not affect the positive picture of the future elaborated by McKinsey’s analysts. This is because they are convinced that technologies can change anything but the politico-economic order. The globalized free market economy—with politics assuming an ancillary role to it—will always be the frame in which disruptive technologies will display their potential and their power. Therefore, the “medicines” needed to remove unwanted side effects are those already used in the past. In this specific sense, the picture of the future produced by McKinsey’s analysis, behind the fireworks of amazing technological innovations, is still quite “conservative.” First of all, they still trust the old “compensation theory” of classical political economy: any job lost because of machines will reappear in the sector of machine builders, if the job market is flexible enough. This is their narrative: “As with advanced robotics, these technologies could also create jobs for experts who can create and maintain the technology itself.”⁵ Secondly, they believe that “over the long term and on an economy-wide basis, productivity growth and job creation can continue to grow in tandem, as they generally have historically, if business leaders and policy makers can provide the necessary levels of innovation and education.”⁶ In other words, they do not deny the necessity of a government intervention, but they seem to circumscribe this intervention in the realm of education.

Brief, more and better education will solve the temporary problem of technological unemployment, as it happened in the past. This

⁴ E. Brynjolfsson, A. McAfee, *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, Lexington (MA) 2011.

⁵ J. Manyika et al., *Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy*, op. cit., p. 49.

⁶ *Ibidem*, p. 27.



concept is repeated in different parts of the report. It is stressed that the problem of income inequality and unemployment “places an even greater importance on training and education to refresh and upgrade worker skills and could increase the urgency of addressing questions on how best to deal with rising income inequality.”⁷ Besides, it is stressed that this solution can be profitable also to capitalists. Actually, McKinsey analysts do not address directly policy makers. They rather ask capitalists to exert pressure on policy makers in order to achieve this result. In their words: “Companies will need to find ways to get the workforce they need, by engaging with policy makers and their communities to shape secondary and tertiary education and by investing in talent development and training.”⁸

What type of education is needed, in order to meet the needs of big corporations in 2025? Once again, the recipe is the same of the past: more math, more science, more engineering.

The spread of robotics could create new high-skill employment opportunities. But the larger effect could be to redefine or eliminate jobs. By 2025, tens of millions of jobs in both developing and advanced economies could be affected. Many of these employees could require economic assistance and retraining. Part of the solution will be to place even more emphasis on educating workers in high-skill, high-value fields such as math, science, and engineering.⁹

In McKinsey’s scenario, education is not only the recipe to eliminate the unwanted side effects of development. It is also a field that benefits from technological development. Namely, “Cloud computing and the mobile Internet, for example, could raise productivity and quality in education, health care, and public services.”¹⁰ Learning would improve both inside and outside classrooms. Therefore, there exists the possibility to activate a virtuous circle thanks to hybrid online/offline teaching models.

Based on studies of the effectiveness of hybrid teaching models that incorporate mobile devices in instruction, drills, and testing (alongside traditional classroom teaching), an improvement in graduation rates of 5 to

⁷ Ibidem, p. 16.

⁸ Ibidem, p. 21.

⁹ Ibidem, p. 77.

¹⁰ Ibidem, p. 18.

15 percent could be possible. This assumes a gradual adoption rate, with most of the benefit coming closer to 2025, when more students will have benefited from online learning via tablets for most of their K-12 years.¹¹

The new approach would obviously also affect higher education, as well as government and corporate training. According to the report, such hybrid models could improve productivity by 10 to 30 percent. In conclusion, “Over the next decade, most types of education and training could adopt Internet-based hybrid education, affecting billions of individuals. The share delivered via mobile devices could have economic impact of \$300 billion to \$1 trillion annually.”¹²

The picture is not complete. Another game changer is mentioned by the McKinsey report: *the automation of knowledge work*. Knowledge work automation is defined as “the use of computers to perform tasks that rely on complex analyses, subtle judgments, and creative problem solving.”¹³ The advances in *computing technology* (in particular, memory capacity and processor speeds), *machine learning*, and *natural user interfaces* (i.e. speech recognition technology) make now knowledge work automation possible. The main novelty of knowledge work automation is that it creates a new type of relationship between knowledge workers and machines. Workers interact with machines exactly in the same way they would interact with coworkers. For instance,

instead of assigning a team member to pull all the information on the performance of a certain product in a specific market or waiting for such a request to be turned into a job for the IT department, a manager or executive could simply ask a computer to provide the information.¹⁴

Computers of the new generation will also display the ability to “learn” and make basic judgments. The possibility to interact with a machine the way one would with a coworker is illustrated by the report with the following “micro-scenario”:

Box 6. Vision: The power of omniscience. It’s 2025 and you arrive at your desk for another day at work. As you take your seat, the day’s appointments are displayed in front of you and your digital assistant begins to speak, giving you a quick rundown of the 43 new posts on the depart-

¹¹ Ibidem, p. 35.

¹² Ibidem, p. 36.

¹³ Ibidem, p. 41.

¹⁴ Ibidem.



mental communications site. Three are important for today's meetings; the rest will be summarized by the system and sent in the daily report. The assistant notes that all the reports and multimedia presentations have been uploaded for your meetings. Now it's time for the tough part of the day: your doctor appointment. You received a request for an appointment yesterday when your biosensor alerted your digital physician to a change in your blood pressure. Your vital signs are scanned remotely, and the system cross-checks this information with journal cases, your family's history of hypertension, your diet and exercise routines, and the vital signs of other men your age. Good news: "You don't need drugs, but you do need to stop eating fast food and skipping the gym," your computerized doctor says. Relieved, you stop at the gym on the way home and ask your mobile device to order a salad to be delivered when you get home.¹⁵

Setting aside the legal and ethical problems related to the transfer of decision powers to computers (it would be hard to find a subject responsible if a computer were to perform an inappropriate diagnosis or provide the wrong therapy advice to a patient), the potential impact of knowledge work automation on employment seems to be quite significant. More significantly, McKinsey's analysts seem to mainly see the positive side of the coin. This happens because—as we already said—they observe the process from the point of view of large corporations.

One of the main problems for corporations is the cost of labor. That is why they benefit from the globalization of the markets and the offshoring of production activities. The report emphasizes that, at present, employers spend \$33 trillion a year to pay employees. The total global employment costs—given current trend—seem destined to reach \$41 trillion by 2025. By focusing on the subset of knowledge worker occupations, employment costs can be estimated around \$14 trillion by 2025. McKinsey's analysts remark that knowledge workers, such as managers, professionals, scientists, engineers, analysts, teachers, and administrative support staff, "represent some of the most expensive forms of labor and perform the most valuable work in many organizations."¹⁶ Therefore, we may expect that the rapid advances in knowledge work automation, by reducing costs and boosting performance, will make these technologies more attractive to the owners of capitals. This is the forecast:

¹⁵ Ibidem, p. 41.

¹⁶ Ibidem, p. 42.

In advanced economies, we estimate annual knowledge worker wages at about \$60,000, compared with about \$25,000 in developing economies, and project that increased automation could drive additional productivity equivalent to the output of 75 million to 90 million full-time workers in advanced economies and 35 million to 50 million full-time workers in developing countries.¹⁷

Would these knowledge workers just lose their jobs? Or would they keep the job and enjoy the augmentation of their capabilities thanks to technology? The report offers a mixed response but in general, there seems to be faith in a positive outcome of the whole process, thanks to the self-regulative mechanisms of the markets and the wisdom of policy makers.

What is missing in this picture?

One aspect that has not been adequately stressed in the report is that *workers are consumers*. If workers evaporate or salaries shrink, we can expect a negative feedback on the economy as a whole. Corporations would find it difficult to sell their products and services. True, goods can also be exported, so one may have sufferance inside a country, while the owners of capitals keep increasing their income. But, in democratic systems, people vote. Therefore, we cannot exclude repercussions on the political system. A system change would render *ipso facto* inadequate all the forecasts about economic gains and losses.

The signals of a system change are already visible. Brexit is the most obvious example, but “no global” movements and parties are growing, both on the left and the right of the political spectrum, in many European countries and North America. Besides, McKinsey’s analysts seem to be perfectly aware that the full automation of manual and knowledge work may render obsolete the present offshoring strategy. Corporations move their factories and offices in countries where the cost of labor is lower and the job market is more flexible. When human workers will be (almost) completely useless and replaced by Artificial Intelligence the offshoring trend may stop and reverse. Factories and offices could move back to USA and Western Europe. However, this “reflux” will not generate jobs in Western countries, and

¹⁷ Ibidem, p. 43.



may contribute to increased unemployment in China, India, Eastern Europe, and all the countries that are presently hosting the production units of corporations. This process could undermine the export strategy without revitalizing the internal jobs and goods market.

Can a better and different education be the response to these economic, political, and social problems? One month after the appearing of the report, Nobel Prize winner Paul Krugman published an article quite significantly entitled: “Sympathy for the Luddites.”¹⁸ Krugman is obviously not a Luddite, nor is a Luddite the author of this article (rather the opposite, I would say). However, social problems cannot be denied only because we may be fascinated by technological developments. The American economist maintains that new technologies are qualitatively different from the technologies that made the first and the second industrial revolutions. In what has been called the third industrial revolution,¹⁹ machines seem to be able to replace not only manual workers, but also knowledge workers, that is, not only proletarians but also the bourgeoisie (or, to use a less ideologically laden concept, the middle class). But can a society function when not only the lower classes struggle to survive, between low paid jobs and crime, but the whole middle class slips into this precarious condition?

Until recently, the conventional wisdom about the effects of technology on workers was, in a way, comforting. Clearly, many workers weren’t sharing fully—or, in many cases, at all—in the benefits of rising productivity; instead, the bulk of the gains were going to a minority of the work force. But this, the story went, was because modern technology was raising the demand for highly educated workers while reducing the demand for less educated workers. And the solution was more education. [...] Today, however, a much darker picture of the effects of technology on labor is emerging. In this picture, highly educated workers are as likely as less educated workers to find themselves displaced and devalued, and pushing for more education may create as many problems as it solves.²⁰

Indeed, the McKinsey report clearly indicates that some of the victims of disruption will be *knowledge workers* – that is, workers who are currently considered highly skilled. Knowledge workers are

¹⁸ P. Krugman, “Sympathy for the Luddites”, *The New York Times*, 14th June, 2013.

¹⁹ R. Campa, “Considerazioni sulla Terza Rivoluzione Industriale”, *Il pensiero economico moderno* 2007, vol. 27, no. 3, pp. 51–72.

²⁰ P. Krugman, “Sympathy for the Luddites”, op. cit., p. 27.

the “product” of higher education. They have invested much time and money in acquiring their skills. The automation of knowledge work means that in 2025, on a massive scale, software will do things that used to require college graduates. Employment in manufacturing has constantly fallen in recent decades because of industrial robotics, and this trend seems to be unstoppable. But advanced robotics could also replace medical professionals, teachers, managers, clerks, and other skilled workers. “Education, then, is no longer the answer to rising inequality, if it ever was (which I doubt)”—Krugman concludes.²¹

So what is the answer? According to Krugman, “[t]he only way we could have anything resembling a middle-class society would be by having a strong social safety net, one that guarantees not just health care but a minimum income, too.”²² In other words, an advanced societal system should start paying citizens purely for the fact that they are citizens. In future societies, people could be paid to consume goods and services, not to produce them. Work may become obsolete. This scenario deserves to be explored in detail.

An alternative scenario

In an article entitled “Technological Growth and Unemployment: A Global Scenario Analysis”²³, I presented four possible scenarios related to work automation: (1) the unplanned end of work scenario, in which jobs evaporate as an effect of free market economy; (2) the planned end of the robot scenario, in which a Luddite solution prevails; (3) the unplanned end of the robot scenario, in which de-industrialization happens to be the unwanted result of wrong public policies; (4) the planned end of work scenario, in which governments decide to fix the problem of technological unemployment through the anticipated retirement of the entire human race.

In this section I will briefly present the ‘the planned end of work scenario’ as a possible alternative to the future envisioned by

²¹ Ibidem.

²² Ibidem.

²³ R. Campa, “Technological Growth and Unemployment: A Global Scenario Analysis”, *Journal of Evolution and Technology* 2014, vol. 24, no. 1, pp. 86–103.



McKinsey's analysts. Then, in the fourth and last section, I will explore the role that education may have in that alternative scenario.

The main reasons why, here, I focus only on the fourth scenario are twofold. Firstly, it seems to me the most plausible one. Secondly, I think it is the most desirable one—if I am allowed to express a value judgement. I will not repeat here *the philosophical and political reasons* that led me to consider this scenario as the most desirable, having already discussed the problem in other writings, including “Technological Growth and Unemployment.” Here I will focus on feasibility.

The planned end of work scenario is plausible, because we can already observe steps in that direction. The introduction of a universal basic income (hereafter—UBI), to be paid unconditionally to all citizens, is a project already being considered by governments in Finland, Switzerland, Netherlands, France, and UK. The same idea has been proposed by the Five Star Movement—presently the biggest opposition political force in Italy. Finland seems to be the country in the forefront.²⁴ The Finnish Social Insurance Institution (Kela) has announced that in November 2016 it is to begin drawing up plans for a citizens' basic income model. A press release specifies that full-fledged basic income would net Finns 560 euro a month. An experiment involving 2,000 citizens should start in 2017. If it works, it will be extended to all citizens.²⁵ Tim Worstall, in *Forbes*, states that “[i]t's hugely important that everyone, simply as of right (whether you call it the right of residence or citizenship is up to you), gets this payment. As is also that it's not taxable, nor is it conditional.”²⁶ The hope is that citizens would keep working, either accepting precarious or part-time jobs, or starting small businesses to improve their income.

²⁴ S. Sandhu, “Finland to Consider Introducing Universal Basic Income in 2017”, *Independent*, 1st April, 2016.

²⁵ Kela, “Ministry of Social Affairs and Health Request Opinions on a Basic Income Experiment”. Available at: <<http://www.kela.fi/web/en/-/ministry-of-social-affairs-and-health-requests-opinions-on-a-basic-income-experiment>> (access: 26.08.2016).

²⁶ T. Worstall, “Finally, Someone Does Something Sensible: Finland to Bring in a Universal Basic Income”, *Forbes*, 6th December, 2015.

In UK, an Early Day Motion on UBI, proposed on January 20th 2016 by Green Party MP Caroline Lucas, asked the government to commission research into the idea's effects. According to Lucas, there could be three main benefits for UK. Firstly, "[t]he basic income offers genuine social security to everyone and sweeps away most of the bureaucracy of the current welfare system." Secondly, a UBI would protect people "from rising insecurity in our increasingly 'flexible' labour market and help rebuild our crumbling welfare state." Thirdly, "the stability of a basic income could be a real boost to freelancers and entrepreneurs who need support to experiment, learn and take risks, while keeping their heads above water."²⁷

UBI is just one of the possible responses to the increasing level automation and it is probably the only solution that would save the capitalistic system from a possible collapse. The owners of capitals need consumers to keep producing, competing, accumulating income. Alternative, more radical, solutions have already been proposed in the past to fix the problem of technological unemployment. In the 19th century, as it is well known, Karl Marx proposed the socialization of the means of productions. In the 20th Century, the socialist solution has been experimented with in many countries around the world. When the robotization of car industry took place on a massive scale, a different but still radical solution was proposed.

In the early 1980s James Albus, head of the automation division of the then-National Bureau of Standards, suggested that the negative effects of total automation could be avoided by giving all citizens stock in trusts that owned automated industries, making everyone a capitalist. Those who chose to squander their birthright could work for others, but most would simply live off their stock income.²⁸

Making everyone a capitalist seems to be different than making everyone a socialist, only in a nominal sense. The focus is on individual citizens instead of collective entities such as Nation-States, but what we are considering is still a form of *public ownership* of the means of production. Brief, Albus proposes a kind

²⁷ J. Stone, "British Parliament to Consider Motion on Universal Basic Income", *Independent*, 20th January, 2016.

²⁸ H. Moravec, *Robot: Mere Machine to Transcendent Mind*, Oxford 1999, p. 133.



of socialistic-capitalistic hybrid system. BCI can instead be seen as the “social-democratic” solution to the problems of precariousness, decreasing incomes, and unemployment.

Is it ‘the planned end of work scenario’ just a utopia? We should clarify that the expression ‘end of work’ is hyperbolic. It would be more correct to say that, in the near future, we may encounter the end of traditional work. Most people would still work in order to increase their income, but in a different way, for instance by running small businesses. This would anyway sign the gradual disappearing of salaried work, as we know it.

Presently, we live in a paradoxical situation. 21st century citizens work more and earn less than 20th century citizens, in spite of all the technological advances that we made in the last century. This means that the owners of capital benefit from robots, computers and other technologies more than their salaried workers. Let us also remember that in pre-industrial societies there were much less working hours than today. Before the industrial revolution, workers were mainly employed in agriculture, therefore they would work only in certain months of the year, only during the daylight, and they benefited from more religious holidays. That is why, in “Technological Growth and Unemployment,” I concluded that “[t]here is no reason why a technologically advanced society should *force* its citizens to work harder than their ancestors, when they could work a lot less and without giving up their modern living standards.”²⁹

Education in a jobless society

Many economists and policy makers are in denial concerning the problem of technological unemployment. They reject this idea as the “Luddite fallacy.” I traced the history of the concept of technological unemployment in another article, in Italian.³⁰ The idea that there is a causal connection between the automation of work and unemployment has been denied by classical economists in the

²⁹ R. Campa, “Technological Growth and Unemployment: A Global Scenario Analysis”, op. cit., p. 99.

³⁰ R. Campa, “Non solo veicoli autonomi. Passato, presente e futuro della disoccupazione tecnologica”, in: *Segnali dal futuro*, eds. F. Verso, R. Paura, Napoli 2016, pp. 97–114.

18th century and the first half of 19th century, admitted by David Ricardo and Karl Marx in the second half of 19th century, denied again by neoclassical (or marginalist) economists at the beginning of the 20th century, reaffirmed by John Maynard Keynes and his successors after the 1929 crisis. When Thatcher and Reagan's neo-liberalism conquered the political arena, the dominant paradigm in economics again became the neoclassical one. However, the 2008 financial crisis has given the Keynesians some good arguments to raise their heads and launch a campaign for a new paradigm change. This may explain the reemergence of the concept of technological unemployment in economic literature.³¹

Let us now imagine that in 2025, advanced industrial countries automatize most manual and knowledge work and support their citizens with UBI. What type of K-12 and higher education will be implemented to make the new system work smoothly? McKinsey's analysts state that 2025 society will need more math, science, and engineering, but their forecast is still inside the frame of the neoclassical economic paradigm, where people need to work in order to survive.

Italian writer Ippolito Nievo, in the 19th century, imagined a future society in which robots would get all the jobs and people would receive money for nothing. The result, according to him, would be an orgiastic society, where citizens would spend most of their time using (and abusing) narcotics and having sex with beautiful robots.³² This visionary scenario cannot be excluded. People have the right to have fun and to enjoy their lives, however, a total lack of responsibility may generate a dangerous situation. A purely hedonistic society could be vulnerable to external attacks. Societies (or nation-States, if one prefers) that do not share the same values and life-style may take advantage of the situation through an aggressive foreign policy. Therefore, a permanent civil and military education of citizens (like that already implemented in Switzerland), taking a few hours every week, could be necessary to preserve a sense of

³¹ M. Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future*, New York 2015.

³² R. Campa, "La 'Storia filosofica dei secoli futuri' di Ippolito Nievo come caso esemplare di letteratura dell'immaginario sociale: un esercizio di critica sociologica", *Romanica Cracoviensia* 2004, vol. 4, pp. 29–42.



community and public responsibility. To enhance a sense of community is of fundamental importance in a society where the life of citizens depends more on the belonging to that community than on individual skills.

In such a society, learning math, science and engineering will certainly be important, because citizens must understand where their income comes from. They must understand the functioning of computers and robots well in order to prevent dangers coming from the misuse of machines and to contribute to the feeding of the “goose that lays the golden eggs.” Scientists and engineers will still be needed in order to maintain and develop these technologies, and they will keep projecting and building intelligent machines, even if they get the UBI. Probably, citizens still working will be less stressed by the idea of losing their jobs and a likely consequence will be that they could not easily be blackmailed, harassed or exploited by the capitalists, since they can rely on a second source of income. But many citizens would keep studying and working to increase their income, fulfill their ambitions, improve their social status.

Contrary to what the McKinsey report seems to surmise, in a totally automated society, we will not register the decline or disappearing of social sciences, fine arts, and humanities. Quite the contrary—if a UBI policy will be implemented. In a world in which all jobs that require precision, speed, effectiveness, regularity, are performed by robots, it makes more sense to acquire—in schools and universities—different types of abilities such as critical thinking, artistic creativity, philosophical understanding, social sensitivity. Many of the small jobs that will be created by citizens will probably be related to their passions. In other words, since they will be supported by UBI, people would have a chance to turn their hobbies into businesses.

Those dreaming of being a musician, a painter, a writer, a poet, a film director, a dancer, or perhaps an influential blogger, may try to tread these paths in an independent way. The Internet will give them access to tutorials, online courses, and human-robot interactions to find advices and information, but they could still need a traditional education based on human-human interaction to improve their skills. True, a robot may paint or play music better than

a human being, but an artistic performance is not based only on the fruition of an artistic product. It is also based on the admiration for the fellow human that performs. We admire the skill of a drummer, because we recognize that (s)he can do something that we cannot do. Even if a human drummer is less precise than a drum machine, a significant number of people prefer to listen to a band that still has a human being playing the drums. People pay for a ticket to see a band playing live, even if they have at home a CD player capable of producing a qualitatively better sound than the instruments played on a stage. What we want, when we go to a concert, is to see the (human) artists performing live. And, very often, we are disappointed if the concert sounds exactly as the CD or mp3 that we have at home. We prefer a different interpretation, improvisations, unpredictable situations, an involvement of the public in the performance, even if these changes may imply some mistakes. We look for a human-human interaction, not only for a perfect sound. This human-human interaction requires a skill. The artist needs to learn not only how to sing and play, but also how to dress, speak, and move on stage.

Besides, in an automated society, people will still need human-human interaction, not only in the field of entertainment but also in the field of care. A robot can help the elderly, disabled patients, people affected by depression or other mental diseases by giving them pills or physical support. Still, people with problems (especially psychological problems) need to establish a relationship with fellow humans. Very often it is the lack of a genuine relation with other humans the source of their problems. In the field of social and medical care, robots can help, but not fully replace humans.

In other words, our future automated society will need social workers, even more than present society. Many small businesses will probably be in the field of social work. Perhaps, some countries will decide to employ more social workers in the public sector. Other countries may introduce a compulsory civil service for all citizens, asking them to help other citizens in a difficult situation (this, again, to preserve a sense of community). Whatever solution will be implemented, social work will require a social work education.

Social workers, even now, choose their job because they feel it as a mission. Social work is not a well-paid profession and there is



a component of voluntary service in it. A sincere need to help others certainly plays a role in the decision to choose this career. That is why, we will not see the disappearing of social workers just because all citizens will get an unconditioned UBI. More generally, we will not see the disappearance of work, because working is more than doing something in order to make money. To work means meeting people, making friends, learning new things, achieving goals, and—we may like it or not—also establishing power relationships. It is difficult to think that humans will stop satisfying these basic needs just because, in principle, they could survive without working.

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