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How the technologies of tomorrow will transform the workforce

How to curtail the negative effects of the transformation and to reinforce the positive ones?

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1 Introduction of a problem, its significance

Since I was a kid, I saw that the world was rapidly changing. I always wanted to achieve some level of significance in this society, but I never had a clue how to do that. I was told that if one studied hard, they would then get into a decent college and have a bright future ahead after graduation. I did study hard, and I did get into a decent college. I am about to graduate, however, what is the future ahead? What kind of job am I going to have, if I am lucky enough to get one? What about five years from now, will I be rendered useless by the technology of tomorrow and will my job be completely carried out by robots? What about ten years from now? What about twenty-five? How is the future going to look like in the near and distant future? What kind of professions are individuals going to have five, ten etc. years from now? What is the future of labor in this ever globalizing and digitalizing society?

In this thesis, I would like to try to answer this question:

How will the technologies of tomorrow transform the workforce and the nature of work people are doing and how to curtail the negative effects of such a transformation and reinforce the positive ones?

This question is especially important these days, when technologies are acquiring skills that historically only humans possessed and the economies of many countries of the Western World are still recovering from the Great Recession. Major scholars agree that unless something is done, the welfare state system, deeply enrooted in the Western society, eventually is going to collapse (Greve, 2013). To sustain it, taxes either need to be raised, the entitlements cut, or some combination of both. Alternatively, the very definitions of labor, entitlements and taxes in general could come under scrutiny and the leaders of tomorrow will have to make hard and unpopular choices in order to prevent economies of the Western world from collapsing.

So far, many generations were afraid that machines are going to take over all the work; however, nothing of such kind happened. It is explained why technology was developing for a long while so gradually and then so suddenly in part three of this work in detail. As weird as the statement would be, the scholars are arguing that in the very near future (matter of years and decades, not centuries) the technology is going to develop beyond

the point of becoming capable of doing almost every type of work that historically only humans could do (Brynjolfsson and McAfee, 2014).

As already mentioned before, the question is also very personal for me. Few believe that soon great changes are going to happen, but I am one of those, thus I chose this particular topic for this work. I would like to learn how to become a desirable professional, better than anyone else capable of racing against the machines. The transformation of the workforce is happening now and everyone needs to understand, whether his profession is becoming obsolete.

Before I answer the question in a comprehensive way, in the second part I will present the results of a thorough reading of literature, which does not even stop when this work is finalized. Next, I will present different scenarios of the development of the world based on the literature review (third part). After that, the policies that should and should not be utilized will be discussed (fourth part). In the fifth part, the study of the current political climate in the European Union and the United States of America will be conducted. Next, the realistic scenario will be presented based on the aforementioned study (sixth part). After that, the conclusion to the work and the used references are presented.

In order to answer the question, the commonly accepted theories of economics and technology are utilized and diligently explained to the reader. The main focus of this work lies on economics, not on technology itself, despite technology being a catalyst of the transformation of labor. Despite many prominent individuals voicing concerns about the technology and its effect on the future and even the survival of our humanity, I intend not to focus on all the possible outcomes, but only on economic ones. The possible scenarios of a doomsday caused by the machines are not going to be mentioned in this academic work.

Mostly qualitative, not quantitative, research is done in order to understand the underlying reasons of the happening phenomena caused by technology, opinions of various prominent figures on these phenomena, and connections between different, seemingly unrelated things. This research provides insights into the problem and helps to develop ideas or hypotheses for potential quantitative research. This quantitative research mostly involves analyzing already collected data, such as historical data on employment, wage growth, median wages, GDP, level of unemployment etc., original sources of data are provided.

This thesis work largely revolves around relevant literature on the subject, thus it can be considered an extended literature review with a synthesis of ideas, with an ingression of some of the author's original ideas. The analysis majorly involves the analysis of the relevant literature and theory on the subject, comparing different points of views of major authors, analyzing flaws in their theories. All of the mentioned above is going to be done by using the critical thinking of the author of the work.

To summarize, this work is dedicated to investigating the effects of technology on the workforce from different points of view. The purpose is to understand how the negative effects can be minimized while the positive are maximized and to offer the ways on how the implementation of such a new economic system can happen in the Western world. Furthermore, based on the existing political situation, the predictions of the future are made. No one knows what the future holds, but we can make our best guess and prepare ourselves for the new realities, coming in the era of brilliant technologies.

2 Literature review

Now let us look at the most important literature written about the topic. I decided to try to focus only on newly published literature on this topic, as the approach to such an issue largely depends on the time, as the innovations happen non-stop. All these books, which we are going to look through critically, were published after or during 2011. The reviews mentioned are printed on covers of books or on official websites. I provide partial references in this part of the thesis, leaving out the publishers. Full references are available in part 8.

- Brynjolfsson, E. and McAfee, A. (2014) *The second machine age: Work, progress, and prosperity in a time of brilliant technologies.*
- Brynjolfsson, E. and McAfee, A. (2011) *Race against the machine: how the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy.*

These two books, written by Andrew McAfee and Erik Brynjolfsson (MIT professors), received high appraisal from numerous critics, such as Michael Spence (winner of the 2001 Nobel Prize in Economics). Mr. Spence says that *the Second Machine Age* is “a terrific book” and continues by saying that “Brynjolfsson and McAfee combine their knowledge of rapidly evolving digital technologies and relevant economics to give us a colorful and accessible picture of dynamic forces that are shaping our lives, our work, and our economies. For those who want to learn to 'Race with the Machines', their book is a great place to start”. Washington Post also posted their own review (Pearlstein, 2014) of *the Second Machine Age*, saying, “the strength of “The Second Machine Age” is how it weaves macro- and microeconomics with insights from a wide range of other disciplines into an accessible and convincing story”.

- Susskind, R.E. and Susskind, D. (2015) *The future of the professions: How technology will transform the work of human experts.*

A relatively new book by two British lawyers and professors. According to Professor Ian Goldin of Oxford, "I know no better book for anyone interested in the future of skill jobs and society". The book claims to set out two futures for the professions, both of which rest on technology. One of them is just a more efficient version of what we have today,

the second one is transformational – a gradual replacement of professionals by increasingly capable systems.

- Armstrong, S. (2014) *Smarter than us: The rise of machine intelligence.*

This book tries to answer the question of what will happen when machines become smarter than humans are. The author claims that the power of an artificial intelligence (AI) comes from its intelligence, not physical strength and laser guns, like the popular movies show. “Humans steer the future not because we're the strongest or the fastest but because we're the smartest”. Stuart Armstrong claims, “when machines become smarter than humans, we'll be handing them the steering wheel”. He questions whether “we can instruct AIs to steer the future as we desire” and “what goals we should program into them”. According to the author, these turn out to be difficult questions to answer.

- Pistono, F. (2012) *Robots will steal your job but that’s ok: How to survive the economic collapse and be happy.*

A bit older piece of writing, however, still very relevant. It received high appraisal from many respected people in numerous fields. According to Piero Scaruffi, an author and cultural historian of Stanford University, “the book's breadth is impressive: its chapters touch on Economics, Sociology, Philosophy, Morality and Artificial Intelligence, and sometimes within the same paragraph”. He goes on to say that, “Pistono is trying to construct a future society in which humans will be happy even though they will be less necessary”. Mr Scaruffi claims the it is rare when an author does not present and “apocalyptic view”. He sums up by saying that *Robots Will Steal Your Job* “is the refreshing exception” claiming “no, we are not doomed”.

- Leonhard, G. (2016) *Technology vs. Humanity: The coming clash between man and machine.*

One of the newest writing on the topic, *Technology vs. Humanity* claims that “Humanity will change more in the next 20 years than in the previous 300 years” According to the book’s official website “T*echnology vs. Humanity* is a last-minute wake up call to take part in the most important conversation humanity may ever have. Will we blindly outsource and abdicate big chunks of our lives to the global technology companies – or will we take back our autonomy and demand a sustainable balance between technology

and humanity?" Few reviews from experts are so far available, as the book has not been published for too long.

3 Scenarios of the developments

In order to understand what effect the technology can have on the development of the society as a whole and, in particular, on the labor force, the scenarios of the development need to be evaluated. The section will look at the general course of the development of the technology, and then analyze the possible optimistic and pessimistic scenarios. The most probable and realistic scenario will not be covered in this part, as in the following chapters the policies contributing to the development of each scenario and the study of the situation will be discussed, which is necessary before the identification of the realistic scenario.

3.1 Course of development of technology

For starters, to understand the future of labor one needs to understand what kind of skills the machines have mastered so far, which they are expected to and which they are not – the skills that machines have or are going to have will become worthless on the labor market. In *the Second Machine Age*, Brynjolfsson and McAfee are arguing that machines are excellent at following rules, but lack at pattern recognition (Brynjolfsson and McAfee, 2014, chapter 2, pages 16-17). Following rules implies making predictions based on certain algorithms, and pattern recognition is the process that goes much further than that, including noticing things in data that follow specific patterns. However, it is worth noting that machines might not be as lousy in pattern recognition as thought before. In 2004, in *the New Division of Labor,* Levy and Murnane claimed that pattern recognition is going to stay uniquely human and is not going to be replaced by machines any time soon. They wrote the following:

> As the driver makes his left turn against traffic, he confronts a wall of images and sounds generated by oncoming cars, traffic lights, storefronts, billboards, trees, and a traffic policeman. Using his knowledge, he must estimate the size and position of each of these objects and the likelihood that they pose a hazard… Articulating this knowledge and embedding it in software for all but highly structured situations are at present enormously difficult tasks… Computers cannot easily substitute for humans in [jobs like truck driving]".

With the recent development in the technology, what was once considered an enormously difficult task has now become a reality with thousands of driverless vehicles cruising around the United States (NBCnews, 2015).

The abovementioned example is just one out of many illustrating how technology has developed rapidly over the course of the last decade. This development is attributed to the power of constant doubling coming from the Moore's law (Brynjolfsson and McAfee, 2014, chapter 3). The Moore's law says that computing power tends to approximately double every two years (Templeton, 2015). The figure 1 below shows Moore's law effects on technology more interactively. This leads to ability to make more and more calculations per second for the same price. One day, most likely before 2030, a computer worth 1000$ will be able to match a computing power of a human brain (Connor, 2008). Following the same logic, one day, a computer worth 1000$ will be able to match a computing power of all human brains. Knowing this can be a very humbling experience.

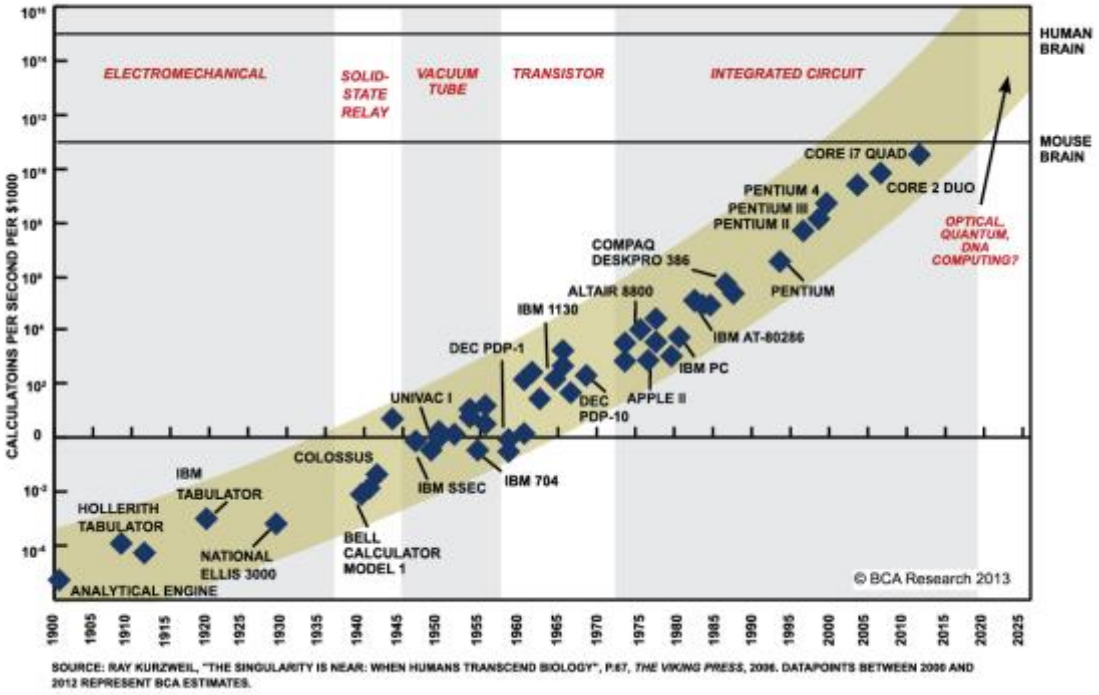

Figure 1. Moore's Law scaling

Paul Krugman speaks for many, if not all, economists, saying that "Productivity isn't everything, but in the long run it is almost everything". He explains, "A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (Krugman, 1997). By output, the number of work hours to produce any item is implied. Bill Nye, an American scientist and a TV personality, said during a televised debate "What keeps the United States ahead, what makes the United States a

world leader, is our technology, our new ideas, our innovation" (Answers in Genesis, 2014). Overall, few believe that constant innovation is not crucial for any given nation.

The future of technology largely depends on whether the rate of innovation is going to decline and on Moore's law remaining true. Just this is a very deep question with contrary points of view, attempting to answer which books have been written; this writing will only briefly address the issue. New accomplishments in technology often state that Moore's law keeps winning and it will continue to be true for years to come (Gibbs, 2015). Nevertheless, Tom Simonite in his article in his article "Moore's Law Is Dead. Now What?" (Simonite, 2016) claims that the technological progress is coming to a halt. Economists such as Robert Gordon or Tyler Cowen tend to agree with the idea, however, others, like the authors of *the Second Machine Age*, believe that even if the Moore's law stops, the growth is still going to continue, as Information and Communications Technology is a general-purpose technology (GPT). It is generally believed that GPTs tend to only improve over time and give birth to new innovations within themselves (Brynjolfsson and McAfee, 2014, chapter 5). It is further claimed that "even if Moore's law ground to halt today, we can expect years of complementary innovations to unfold". For simplicity, all the scenarios covered in this work will operate under the presumption that the technological march continues for the foreseeable future and the intelligence of a machine will match human intelligence.

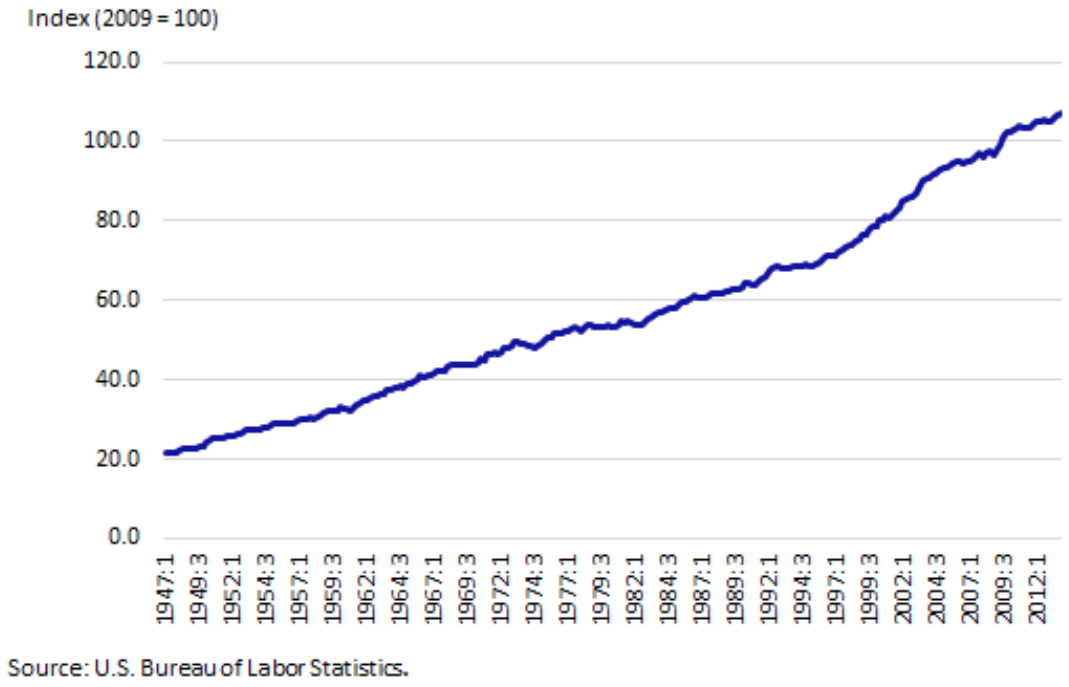

Figure 2. Labor productivity statistics in the US (1947-2012)

The two main economic effects of the constant innovation can best be summarized by the terms Brynjolfsson and McAfee use throughout their book - the bounty and the spread.

The bounty is defined as "the increase in volume, variety, and quality and the decrease in cost of the many offerings of modern technology". Once example of bounty is that these days an individual anywhere in the world with an Internet access has better (and completely free!) access to information than the President of the United States had 20 years ago. According to labor productivity statistics, in 2012 it would take an average American worker only eight hours of labor per week to produce as much as he would produce in forty hours in 1947, the figure 2 above illustrates that. Overall, bounty means producing more, cheaper, better and quicker.

The spread is defined as "the ever-bigger differences among people in income and wealth, likely to accelerate unless we intervene". In 2016, the richest 62 people on the world were worth as much as half of the world's population combined (Elliott, 2016). In 2017, mere 8 individuals are worth as much (Reuters, 2017). Just a couple of years ago, the number of individuals was at almost 400. Until the late 1990s, the increase of real per capita GDP growth corresponded with the median adjusted household income. Since then, however, they diverge sharply (Stockman, 2014).

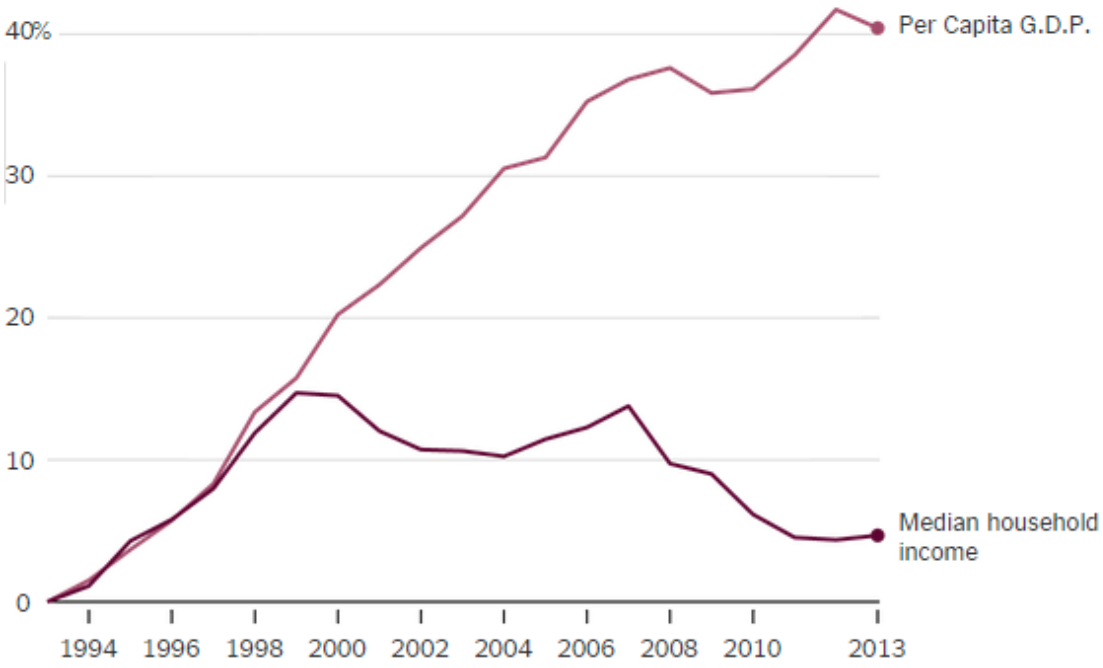

Figure 3. Real GDP per capita vs. Median household income growth since 1993

These two effects represent the two sides of technology, bounty representing the positive and spread representing the negative. Understanding that technology cannot be considered 100% a positive or a negative force is crucial in order for us, humans, to call for the implementation of the right policies targeting increasing the bounty and minimizing the spread, i.e. reinforcing the positive effects of technology and curtailing the negative ones. It is furthermore important to understand that we are already living in another economic reality, caused 100% by the technological progress. The same economic theories and doctrines that applied a couple of decades ago might be completely useless today. We need to stay open-minded about what policies should be implemented by thinking critically and challenging ourselves to think way outside the box, as the policies needed in the world of tomorrow are completely unconventional and some may consider them to be completely absurd.

This new economic reality, contributing to the appearance of the spread, has created a phenomenon called winner-take-all economy, where the superstars in the particular field are enjoying super high profits, however, those how are just a bit worse than the superstars, are left far behind. The best lawyer can make hundred-fold or thousand-fold difference with a mediocre lawyer; the best writer can make million-fold difference with a mediocre writer. Traditionally, the one who had 70% of the skills of the best one was rewarded 70% of the paycheck of the best one. In the current economic model, no consumer cares about even the second-best, the one who does something just a little bit better often ends up dominating the whole market.

This winner-take-all effect is directly contributed to the rise of technology, as it lessens the barriers to compete in many fields of business (Investopedia, 2010). Digitalization made it possible for a single application developer, even without any team, to enter a global market and reach enormous audience. If the application is deemed worthy, it can easily capture a huge market share. These days, a single producer can fulfill the demand internationally, without any restrains. Marginal cost of goods approaching zero made this economic model possible (Buytaert, 2014). Last but to least, in the winner-take-all economy the very pattern of wealth distribution changes. It used to be illustrated by the normal distribution, but now is it more and more shifting towards power distribution. In the figure 4, the horizontal axis symbolizes wealth and the vertical one symbolizes how many people have that much. It is a difficult scenario to understand, as when we think about the very concept of wealth distribution we imagine most people belonging to the middle class, i.e. in the middle of the graph, however that might not stay the same.

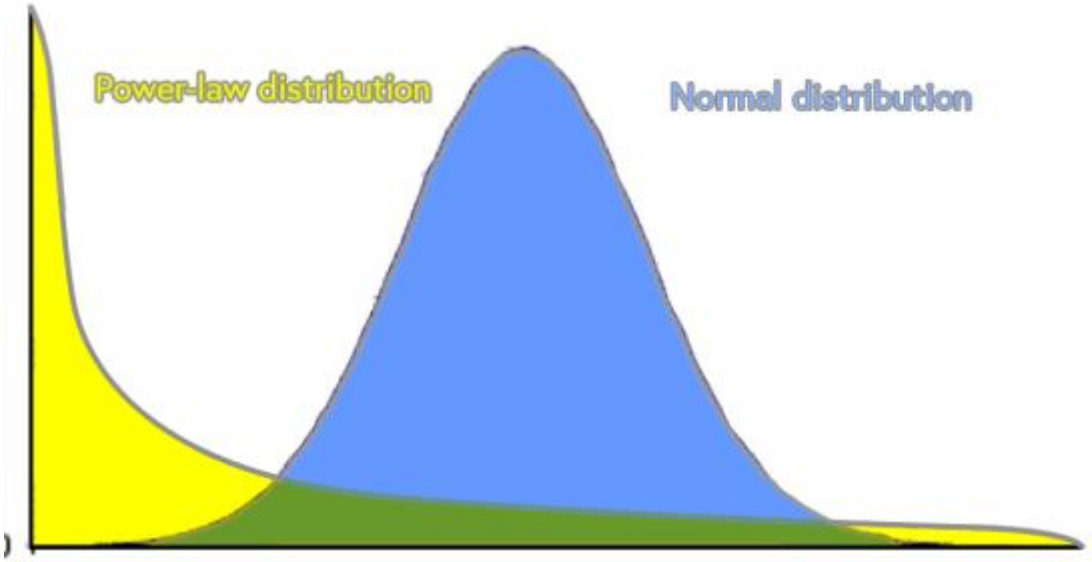

Figure 4. Demonstration of normal vs. power-law distribution

To sum up, overall observations were made about the effect of the technology on the human lives and on the workforce in particular. Further, the optimistic and the pessimistic scenario of how the trends of today will be transmitted into the lives of tomorrow are going to be covered.

3.2 Optimistic scenario

In this part, the outcome of an optimistic scenario is going to be discussed. Here, we will be operating under the assumption that the set policies of tomorrow will be sufficient to contain the spread and increase the wealth of not just a selected privileged few, but of many. What the policies for such a development and their feasibility will be discussed in the following chapters. Only if the spread is contained and the economy starts to work for everyone, not just for the winners, sustainable development can be achieved.

The only way in which the society of the future will be able to operate is by extended cooperation between humans and machines (Brynjolfsson and McAfee, 2014, chapter 12). Even though no human being can beat a computer in chess anymore after a historic Deep Blue vs. Gary Kasparov match of 1997, a human in a cooperation with a computer still beats a computer. This is just one of the examples of how machines might not necessarily replace but in fact enhance humans. The room for such an enhancement occurs because a computer lacks an essential skill humans possess – ideation.

Computers just do not *yet* have it in them to create new ideas. All that computers can do so far is following the patterns programmed in them by their creators; computers are terrible outside of the patterns programmed into them. Humans are inherently better than intelligent machines at tasks that require large-frame pattern recognition, which is needed to come up with ideas, thanks to humans' ability to perceive the world much deeper and wider, using senses. In the future, more intelligent machines will appear and take over even that advantage, however, there is little reason to believe that such a breakthrough can occur soon, even though works on developing a better vision and hearing for machines are under progress. As a side note – the development of technology has already gone so far that one can rest assured that for any technological marvel from science fiction, there is research currently being done in order to make it a reality.

In the future, the most important job requirement of the future will be the ability to work in a symbiosis with a machine. Human will generate complex ideas and machines will put them into action. In order for that to happen and for the workforce to be redefined to learn to work with technology, broad investments in training programs must happen and the leaders of firms and countries must genuinely want to exploit their people in the way that is going to be most beneficial for them in a long, not in a short run. High-educated workforce does bring value to the companies and to the states.

Strong and educated workforce is in fact going to make the economy work for more and more individuals. It in no way means that the wealth of the rich is going to be redistributed or that there will be no winner-take-all economy anymore. Capable workforce is good news for the rich, as it is a way to get even richer. Outsourcing the right kind of jobs to the machines and making humans work more with the machines is the key. If machines are made to augment people instead of replacing people, it will benefit the entire population over a longer period (O'Reilly, 2016), as the productivity will further and further increase.

In this scenario, bounty continues to increase, as new and new innovations appear. Possibly, the need for labor is going to decrease in the long run, as machines become closer and closer to people in terms of capacities. However, the decrease of the need for labor is not necessarily such a bad thing, as the technologies of tomorrow might make marginal cost of living close to zero. Potentially, it could create a situation where the

essence and the purpose of work is completely redefined and is not for anyone considered as just means to support himself but as something much more.

For this kind of scenario to take place, the skills and abilities of the whole population need to be accessed; everyone in the society needs to forget about putting oneself, one's relative or one's fellow national first, it needs to be about putting first the one, who can benefit the society most in the long run. Nepotism cannot be allowed. However, adopting this thinking cannot be easy when it has been enrooted in us for so long.

Having people work with the machine for the common good of this humanity and keeping an open mind about the possible complete redefinition of oneself in the labor force and the purpose of labor in general will most likely become two of the most crucial factors for the prosperous development of this humanity.

3.3 Pessimistic scenario

In this part, the outcome of a pessimistic scenario is going to be listed. In description of the optimistic scenario, we were operating based on the assumption that the spread is going to be contained, on contrary, in this scenario we will operate based on the opposite prediction.

If the spread continues to grow, it means that the wealth distribution continues to favor the winners of the economy and the winner-take-all-based economy model is only going to continue to gain ground. Many people argue that the growing inequality is not a problem. Everyone's level of living is getting better, however some's wealth is just growing quicker (Mankiw, 2013). This is a case, inequality in its essence is a good phenomenon. It makes people to strive to have more, it encourages entrepreneurship and it gives birth to new ideas. The products of the top entrepreneurs like Steve Jobs are enjoyed by hundreds of million people worldwide, therefore if there were more people like him it would not at all bad, even if it contributes to more inequality (Salmon, 2011).

However, this is unfortunately not precisely the case. As seen before, the median American household income is not just growing slower than the wealth of the whole nation, it has actually decreased. Brynjolfsson and McAfee admit:

> Other data - about poverty rates, access to health care, the number of people who want full-time jobs but can only find part time work and so on - confirm the impression that while the economic bounty from technology is real, it is not sufficient to compensate for huge increases in spread.

If no significant changes are done, continuous rise of the spread can be expected to create a vicious cycle, as those left out from the winner camp will share less and less earnings, which in return will prevent them from investing in themselves (by getting higher education, for instance), cutting their only way of becoming the winners of tomorrow. According to an Australian MP and Shadow Minister of Finance, "if we get the choices [about our future] wrong, we will end up in a society divided into two camps, those who have the ability to work with machines, and those who are replaced by them" (Chalmers, 2014).

People's inability to invest in education will make it harder and harder for them to compete with the machines, as the machine labor is becoming cheaper and cheaper. Serious pressure driving down the wages for the bigger part of the population is going to occur within the society. In principle, wages are determined based on the equilibrium of supply and demand (Ortega, 2011). The troubling truth about the wage equilibrium is laid out by Brynjolfsson and McAfee:

> In principle, the equilibrium wage could be one dollar an hour for some workers, even as other workers command a wage thousands of times higher. Most people in advanced countries would not consider one dollar an hour a living wage, and don't expect society to require people to work at that wage under threat of starvation. What's more, in extreme winner-take-all markets, the equilibrium wage might be zero. …. If neither a worker nor any entrepreneur can think of a profitable task that requires that worker's skills and capabilities, then that worker will go unemployed indefinitely.

They continue and describe that has already happened over the course of history to production that once were valuable. People's inability to compete will cause them to be rendered useless by technology. Obviously, the economic effects of equilibrium wages being nullified for many workers would be profound. Unemployment can be expected to skyrocket.

Might the aforementioned scenario start to unfold, high levels of unemployment would in return drastically diminish the buying power of the market, causing in return the reduction of innovation, thus bounty would also flat out. The wealth of the entire nation, not only the middle class, can be expected to start to decrease as a result.

In this scenario, humans do not find a way to work with the machines, but are just being ruthlessly replaced. The camp of the replaced people becomes greater and greater; bigger and bigger parts of the population become paralyzed due to their inability to compete with the machines. High inequality usually leads to tensions, which become harder and harder to constrain for those in power. At the end, frustrated and rendered useless people could even end up revolting against the elites, benefiting from technology and the intelligent machines (the revolt is not necessarily done with weaponry, supporting people of power trying to suppress the march of technology is a more likely form).

If such a revolt is successful, it could cause the new regime to try to suppress the technological growth and development, which would cause the society to go back in terms of the technology used. As the lack of innovation causes stagnation and worsens the standards of living for the population, this would cause massive devastation and economic depression. Suppressing technology and trying to protect the old style of living has historically proven to fail.

If such a revolt is unsuccessful, we could also expect to see the elites leading the far more intelligent machines to fight back against the masses, trying to defend themselves from the aggression. This could ultimately result in the majority of human species being wiped out or machines dominating humans.

If humans do not revolt, then the possibilities for humans to work become more and more scarce, and more and more people end up living in poverty. In return it could cause the ultimate degradation of human species, as labor in one form or another is deemed essential. Alternatively, the masses might just end up having nothing

To sum up, in the pessimistic scenario of the development, where the spread is not contained and human do not learn to cooperate with the machines, either humans end up suppressing the technology and reversing the progress, or the intelligent machines wipe out the human species either mentally, by making them irrelevant and depriving them of the chance to work, or physically, using guns and missiles.

4 Policies of tomorrow

Having discussed a pessimistic and an optimistic scenarios of the future in regards to technology, the next logical step would be to discuss what policies contribute to the development of either scenario. Obviously, the reverse of a policy in one category puts it into another category.

4.1 What policies should be implemented?

4.1.1 Rethinking tax policy

4.1.1.1 General rule

In order to enter into the second machine age prepared, the society needs to completely rethinking the taxation system. The general rule that should apply – *tax what you want less and do not tax what you want more*. Basically, the government needs to encourage the activities that it wants to see happen more in the future by not burdening them with taxation, and vice versa, the undesired activities need to be taxed heavily.

For instance, labor is an essential thing for the society, and with the ever intelligent machines driving the prices for labor down, the government should encourage companies to hire. Instituting difficult restrictions and putting heavy taxes will push the possible employers even further from hiring by making them pursue the path of automatizing even quicker – technology always wins in a long run and there's little doubt that most jobs will get wiped out and many humans will become unemployable, like explained before (having no worthy skills), however, instituting additional limits to employment and having a failing tax policy would only expedite it. Obviously, completely dismantling the income tax system is barely doable in the world we live in; regardless, some recommendations on how to implement the rule still can be given.

As for an activity that the government wants to see less, consumption of alcohol could be considered. By putting tariffs on that, the government collects money from an undesired activity and at the same time encourages people to do it less. This is the best sort and example of taxation, as in addition to collecting revenue the government constantly discourages people from engaging into the undesired activity.

4.1.1.2 Laffer's theory

In addition to the general rule, it is important to remember the theory of Arthur Laffer, which says that there exists some tax rate between 0% and 100% that will result in maximum tax revenue for governments. Laffer curve is an illustration of such a theory. The figure 5 below depicts the Laffer curve and shows the revenue maximizing point, as well as regions of increasing and decreasing revenue.

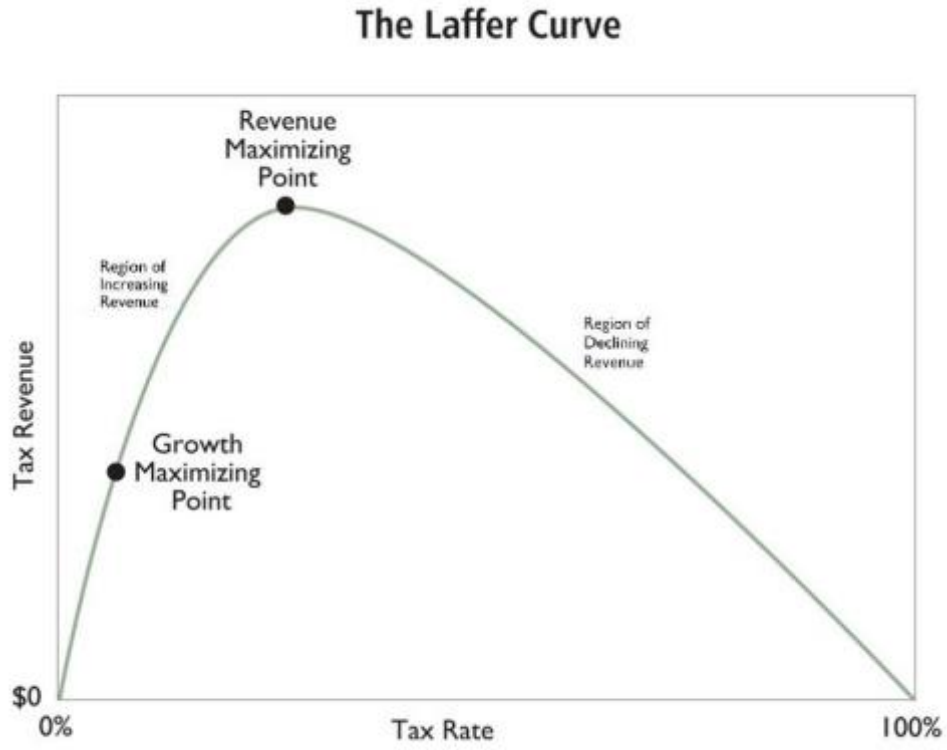

Figure 5. The Laffer Curve. Source: Mitchell, 2012

The biggest disagreement for many economics is at where the Laffer curve's highest point is actually located. Answers range from 19-70%. According to respected American liberal (it is a classic liberal stance to advocate for higher taxes) economics professors Christina and David Romer, the point when the government gets most revenue is around 33% (Romer and Romer, 2007). This means that excessively taxing the rich actually creates a negative effect on the revenues of a country, despite many individuals saying that excessive taxing on the rich constitutes social justice. Even if in the minds of some lack of "punishing" the rich with high taxes is injustice, they themselves will be better off with taxes for the rich being less, as those taxes is where the money for all the social programs obviously originates.

4.1.1.3 Flat taxation

Furthermore, having shown the negative effect of excessive taxation, the argument for a flat tax rate has to be made.

First of all, everyone giving up the same percent of their paycheck for a common goal can be considered as the very definition of fair share, as the share given up is, in fact, the same. Secondly, the tax system becomes clearer and easier to comprehend. Loopholes, utilized by the rich, disappear. Lastly, flat tax rate saves the financial cost of complying with IRS regulations, which is these days barely possible without involving lawyers and accountants. The study done in 2011 put the time value tax payers must bear to pay their taxes at $377.9 billion dollars and the total cost of compliance is estimated to be $431.1 billion dollars (Laffer, 2011).

However, some disagree with the proposal, claiming that the debt would skyrocket, as the rich would start paying a smaller proportion of the taxes. Historically, it has been proven to be false. According to Richard Rahn, an American economist (Rahn, 2010):

> By the time President Reagan left office, the economy was generating more tax revenue at a maximum 28% rate than many on the left forecast it to generate at a maximum 70% rate. The Reagan tax-rate reductions did, in fact, pay for themselves — but it took about seven years.

It also is known that prior to the passage of the tax, in 1981 the top one percent of American earners accounted for nearly 18 percent of federal personal income tax revenue. By 1988, the one percent accounted for nearly 28 percent (Forbes, 2016).

Considering the aforementioned studies, the proposal to flatten the tax rate and decrease taxes may not be so popular among many, as they state that it's easy for the rich to pay a bigger percentage of their income for the common goal, however it is sensible and would in the long run benefit the very people opposed to it. Nevertheless, it is claimed that higher taxes push people to keep money in the businesses and withdraw as little as possible, in order to not report significant profit to avoid the task. It is also stated by some that the progressive tax increases the revenue for the government and the rich are the one most capable to pay. Another argument is that the progressive tax system prevents the wealth disparities between the least and the most fortunate (Goodman, 2016), which is crucial for maintaining a stable society. The example of some Western developed nations such as Canada, Australia or Sweden is given to support the claim that higher

taxes and the progressive tax rate are not detrimental to the development, on contrary, can actually contribute to it.

The author of this work does not want to dismiss the argument completely and acknowledges that the examples of some Western nations is an example of a successful implementation of the progressive tax system. Nevertheless, the author strongly believes that the flat tax system is significantly better and more sustainable in the long run and the welfare state system adopted in many Western nations is going to eventually fail, as social security systems all around the world fail to stay solvent (for instance, the United States Congress regularly has to inject more and more money in the social security system in order for it not to fail completely). It is furthermore true that may the taxes increase, more and more people would just lie in their tax returns, elaborate tax returns by using loopholes in the law, hide the profits or move the money and the whole companies to lower tax regions. Forcefully trying to prevent any of that would cost a lot of money and requires even higher revenues, which in turn means raising taxes even further, thus causing more disobedience and less compliance. The latter is the very thing forcible prevention is used to prevent, thus the very purposes of the interference fails and the wicked circle begins, if the government wishes to continue with its policy.

4.1.1.4 Introducing negative income tax

The third and the last taxation proposal is the introduction of the negative income tax.

Negative income tax is a sort of taxation system where people earning below a certain amount receive supplemental pay from the government instead of paying taxes to the government. The system could be introduced as a substitute to the unemployment benefits and could be a way to solve the welfare trap. (The welfare trap is a theory asserting that taxation and welfare systems jointly contribute to keep people on social insurance, as the withdrawal of social benefits that comes with entering low-paid work causes there to be no significant increase in total income, it is described in detail in 4.2.1). In this system, additional money made would contribute to the total income, unlike in the unemployment benefit system. This system is proposed as a replacement for all unemployment and other social security benefits, as completely dismantling social security would be relatively problematic.

For instance, if the rate for the tax would be 30% and the cut-off limit set at 3000$, the following table shows one's possible levels of income and of the benefit they would be entitled to. This is purely an example table, it in no way is a proposal of a cut-off limit and the tax percent. The proposal is presented is 4.1.1.5.

Table 1. The explanation of negative income tax

Earned income	Added income	Full income
0$	(3000-0)×30%=1000$	1000$
500$	(3000-500)×30%=750$	1250$
1000$	(3000-1000)×30%=600$	1600$
1500$	(3000-1500)×30%=450$	1950$
2000$	(3000-2000)×30%=300$	2300$
2500$	(3000-2500)×30%=150$	2650$
3000$	(3000-3000)×30%=0$	3000$

However, to avoid improper usage of the money received, restrictions on usage could be applied. One of the means to do so would be by giving out the excessive funds in the form of coupons or a special card, which can only be used in a few stores, selling the needed minimum (food and clothing supplies of low quality). As, for instance, using any drugs is generally discouraged by the governments, no legal intoxicants would be sold in those stores. In addition, another measure could be that the previous benefit could run out at the end of the month in order to avoid having people save up in order to trade some products.

4.1.1.5 Proposed tax system

Based on the aforementioned observations, the tax of 20% for all income brackets is considered with a monthly cut-off limit of 2000$. For households consisting of more than one individual, the cut-off limit is multiplied by the number of people in the household. Possibly, some additional tax relief benefits could be added in order to encourage creating families and getting descendant, if it is part of governmental agenda. This work does not discover those benefit options for simplicity purposes.

Table 2. An example of taxation

Earned income	Tax	Income after tax
0$	(0-2000)×20%=-400$	400$
500$	(500-2000)×20%=-300$	800$
1000$	(1000-2000)×20%=-200$	1200$
1500$	(1500-2000)×20%=-100$	1600$
2000$	(2000-2000)×20%=0$	2000$
2500$	(2500-2000)×20%=100$	2400$
3000$	(3000-2000)×20%=200$	2800$
3500$	(3500-2000)×20%=300$	3200$
4000$	(4000-2000)×20%=400$	3600$
4500$	(4500-2000)×20%=500$	4000$
5000$	(5000-2000)×20%=600$	4400$
10 000$	(10000-2000)×20%=1600$	8400$
50 000$	(50000-2000)×20%=9600$	40 400$
100 000$	(100000-2000)×20%=19600$	80 400$
500 000$	(500000-2000)×20%=99600$	400 400$
1 000 000$	(1000000-2000)×20%=199600$	800 400$

4.1.2 Abolishing minimum wage

As already mentioned before, heavier regulations on employment put breaks on potential employers for hiring. In addition, the minimum wage regulations and requirements like mandatory health insurances for the employees discourage business owners (especially small business owners) from additional hiring and cause getting rid of unnecessary unessential workers. Gorman, 2007, notes about the minimum wages laws:

> Most non-economists believe that minimum wage laws protect workers from exploitation by employers and reduce poverty. Most economists believe that minimum wage laws cause unnecessary hardship for the very people they are supposed to help.

The minimum wage laws do not protect workers, on contrary, they increase unemployment, especially among the youth and the uneducated. It comes from the simplest rules of economics - wage is just a price of labor. Prices are determined on the

basis of supply and demand. Same principle applies to wages, as no one in the Western world would take a job paying 10 cents an hour (no demand for such a low price), as well as no one would hire a cleaner for 100 dollars an hour (excess of supply, a worker can be found for significantly cheaper). When supply and demand match, the wage appears. If the government mandates a certain minimum wage level, people at the start of their careers end up being unable to land a job, as their skills are not worthy enough at that point of time, so they are cut off from the labor market.

This concept can be better explained with an example. A young person (John) wants to work in a small local café as a cleaner. Logically, this kind of job requires little to no experience and a candidate for it would most likely be selected based solely on the price for their labor. For an employer, this job is worth 5$ an hour. John agrees. However, if the government mandated minimum wage is 10$ an hour, John will not be hired, as his skills and his jobs will not worth so much at that moment for the employer. As an outcome, John loses money and possibly valuable work experience for the future. The potential employer has to get by with less personnel and has to make the existing personnel work so effectively that they would command the value of their wage. The situation is a lose – lose.

This concept is precisely what Paul Samuelson, liberal American Nobel-prize winning economist, one of the most influential ones of the 20th century, described in 1973: “What good does it do a black youth to know that an employer must pay him $2.00 per hour if the fact that he must be paid that amount is what keeps him from getting a job?” (Gorman, 2007).

Even for the people who already have jobs at minimum wage, the raise thereof could be damaging. An employer is not going to operate his business at loss and will have to adopt by reducing the workhours of his staff and making the remaining work much harder. Part of the personnel might be let go completely. The minimum wage can mandate how much a person would make an hour, not in a week or in a month. It also cannot guarantee that a person who wants a job will get one.

The supporters of the concept believe that the minimum wage laws believe that in addition to protecting the most vulnerable class – the poor, who have to work for the minimum wage, the minimum wage laws increase the job growth and creation (with little justification on how it does that) and increase productivity. No opponent of a minimum wage believes that that it does not increase productivity, however, the underlying price for it is expensive – instead of gradual addition of technology to the workplace, which could happen in a form of augmenting humans rather than substituting, a very sudden forced substitution has to happen, as businesses have to adopt.

Furthermore, the supporters of minimum wage openly claim that it removes low-paid jobs. Obviously, it is a good thing – no argument there, but the problem with removing low-paid jobs is that the individuals do not usually work those jobs out of any desire but out of incapability to educate themselves further and get a better job (of course there are also many of those who are at the very beginning of their career and it is just a stepping stone, or can educate themselves, but do not have the means to do it at that moment, for the latter, address 4.1.3). There exist vast layers of population who do not have any skill other than the one due to become worthless very soon, there exist vast layers of population who will never be anymore able to acquire a new paying skill (due to them being uncomplicated and less able intelligence-wise) – those people would suffer if the employers are pushed to pay them higher wage, if their skill is unworthy of it.

Especially in high technology era, it is impossible to say that one must pay his workers more than some amount. If that happens, businesses and workers end up suffering from the unintended effects and individuals, especially the youth, end up being unemployed and possibly even worse - unemployable. The existence of minimum wages pushes employers to replace people with technology whenever possible, instead of slower augmenting people with technology, which would overtime increase the value of labor of those workers.

4.1.3 Encouraging education

Education is perhaps one of the most important ways to ensure that people are capable of doing high quality labor and are not stagnating but will be rushing into the second

machine age and benefit from the technologies of tomorrow. Wider access to tertiary and even quaternary education needs to be provided to the masses, the importance of receiving education needs to be stressed from the very birth, people need to be to some extent judged by their peers and others based on them being educated or not, being uneducated needs to be made unattractive and frowned upon.

However, in addition to that, not only education needs to be affordable, there need to exist comprehensive programs (grants, student loans, student benefits etc.) to ensure possibilities for individuals to finance their livelihood, so that students and striving students would never need to worry about ensuring financing from their relatives, a bank, or time-consuming and distracting from education part-time job but could instead focus on the process of education. The decisions on who receives the further and further education should never be based on one's financial wellbeing but on one's intelligence. If the government helps individuals to become more educated by providing financing instead of putting individuals into massive debt holes that takes decades to get out from, the workforce would be much more up-to-date and ready for the future lives in the technologically advanced era.

Quality of education definitely needs to improve. For instance, for the first half of the twentieth century, the United States was the clear leader in terms of primary education. However, now the American youth is lagging far behind the youth in Canada, Japan, the Netherlands and other countries (West, 2015). The quality and the level of education one receives directly corresponds with the future wage of the individual and, accordingly, the quality of living. The figure 6 shows the growth of wages of different individuals, according to their education group. It is easy to note a very direct correlation between the wage growth and the level of education. It is also worth noticing that the wages of all categories of individuals except high school dropouts are rising, however with very different speeds. The bargain between higher accountability of teachers and the increase of their salaries would profoundly increase the future quality of life of current American children (Brynjolfsson and McAfee, 2014).

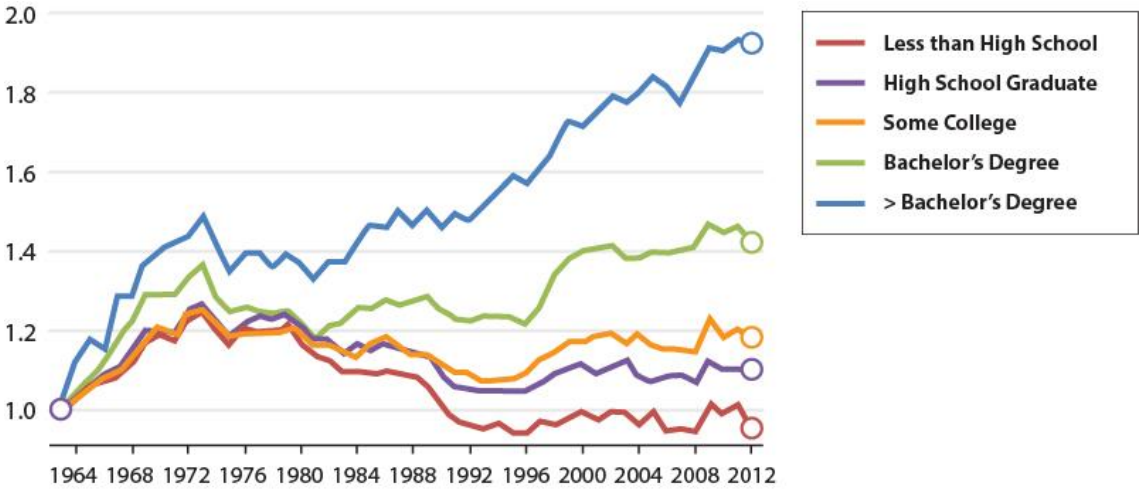

Figure 6. Changes in Real Wage Levels of Full-Time U.S. Male Workers by Education, 1963 – 2012 (Kirsch, 2015)

The nature of education also needs to change, according to the changes in the professions (Susskind and Susskind, 2015). People need to learn things relevant to their lives and to their future careers. Learning the past of professions becomes increasingly useless. In addition, education needs to be tailored towards individual students and their needs and not towards the class's needs in general (Kumar, 2012). Acknowledging individual differences is crucial. Technology can help to achieve the level of personalized education in schools and universities, despite having completely personalized approach is impossible.

It is also worth mentioning the importance of self-education. There exist numerous free online resources that educate one in things starting from sewing to language learning. Through self-education one could learn all the things taught in the best colleges of the world for free. Many of those best colleges even organize massive online open courses (MOOCs), for free or for a small fee. This gives the possibility for 12-year-olds self-starters to enrolls in those university-level courses and self-educate. Ironically, this is also an aspect that creates spread, as by far not every kid is interested in consuming knowledge. Real efforts need to be made to spread the idea of taking these MOOCs for the masses, as by itself “the digitalization of education won’t automatically reduce the spread” (Brynjolfsson and McAfee, 2014).

4.1.4 Encouraging entrepreneurship

Encouraging entrepreneurship is beyond important. Small businesses generate jobs in huge amounts, and it is one of those few sectors where the job creation speed is actually growing (Decker and Haltiwanger, 2014). According to some sources, start-ups are the only jobs creators in the entire economy (Kauffman Foundation, 2010). Especially in the time when automation is on the rise, it is profound that new jobs and even industries are invented. The only people, who are capable of doing it, are entrepreneurs. Furthermore, entrepreneurs drive social change, as the inventor of any given product rarely can rarely know how to sell it or otherwise monetize his invention and whether it is even worthy of being sold. Entrepreneurs do know that.

Small start-ups or idea-level projects all over the world struggle to borrow any money, however, they are the biggest job creators, so them being supported pushes the economy further (Kiisel, 2013). Introducing programs to support entrepreneurship and funding small start-ups is one of the most crucial investment any country can make in its future. It can be done either by establishing an organization that would buy in the equity of the company for certain amount of money (like it is done by business angels) or by providing low-interest loans or even grants, if the idea is considered especially worthy for the society. Creating networks between people with money looking to invest and people seeking investments is another opportunity.

Organizing startup incubators helping people at the start of their entrepreneurship career is also a good way to get people together and to motivate them to achieve their goals. More places like Silicon Valley could be created.

Increasing the simplicity of starting and running a business also has direct correlation with the level of entrepreneurship and innovation in any given country. In some countries starting a business can be done just by following simple instructions online and can be completed just in one day. In others, however, it can be costly and could take days or even weeks to complete all the paperwork (The World Bank Group, 2016). Submitting the documents to the tax office can also be done in many very different way. The principle should be - the simpler the procedure, the better.

Last but definitely not least, providing tax breaks for starting businesses could be a great solution as well. A small business always has deep solvency issues. A country can help

a business grow and develop quickly by allowing it to operate without paying VAT or income taxes for a certain period of time. Perhaps, quite strict criteria could be established for being able to qualify for the break and the extension of a break could only be possible if a company hires a big number of workers.

4.1.5 Redefining politics

At this of history, politics rotate around what feels good for people at the moment, not what is going to do good in the long run. This is deeply troubling, as politicians tend to make beautifully phrased promises, which end up making lives worse for the population. This is done everywhere in the world by the representatives of both political left and right. Populism becomes more and more spread all around the world. Populists try to unite unsophisticated people, who understand little about how economics work, around some idea in order to get elected.

Politics of tomorrow need to be redefined, as the crisis of democracy has long been noted. It is unclear what system could be placed instead of democracy. In the words of Winston Churchill, "Democracy is the worst form of government, except for all the others". Politics need to become more selfless, candidates need to start saying what scares usual candidates to say. The ideas like abolishing the minimum wage sound often deeply scary, despite the fact that they would improve the lives of people. Educating people is essential for them to make smarter choices politically.

Furthermore, the tie between money and politics has to be overcome. When money is connected to politics too closely, elections stop being about finding the best and the most favorable candidate according to their views and ultimately start being about who was able to gather more money by selling more favors, which deeply undermines system's legitimacy. The problem of money in politics is so universally recognized, that people like President Donald Trump and Senator Bernie Sanders seem to agree about it (Cadieux and Berman, 2016), though their proposed solutions might be different. In the US, especially in the municipal level elections, the candidate who raised more money tends to win. In the election of 2012, 95% of those who spent more won (Seeker Daily, 2016).

Chances are, unless politics are changed, the world will not itself adapt to the realities of the new times.

4.1.6 More open borders

Professional labor force should be allowed to move across countries with little to no restrictions. Opening borders to highly qualified foreign workers helps to grow the economy and the wealth of the entire society. Those immigrants do not “steal workplaces” or lower the standard of living by pushing the prices for labor down, they actually do the opposite. Obviously, this is addressing only highly qualified immigrants and in no way propagates for open borders for all workers, which would in fact be detrimental.

Despite prominent anti-immigrant movements on the rise around the world, it is important to understand that strong labor force regardless of its origin is actually advantageous for an economy of any country and to understand the distinction between highly qualified and not qualified immigrants.

4.2 What policies should be avoided?

4.2.1 Welfare system encouraging the poverty trap

One of the most detrimental policies that the state can implement, and, unfortunately, many western nations around the world have implemented, is the type of welfare system that puts people into a welfare or poverty trap. According to the Business Dictionary definition (*What is poverty trap? Definition and meaning*, 2017), the poverty trap is a…

> situation created by tax laws and income related social security benefits that prevents people from climbing out of welfare dependency. If these people strive and earn more, they move into higher tax brackets and end up having even less disposable income than before. After trying several times, they generally give up and may accept the situation as their fate.

For instance, an example of a welfare trap is when a person on welfare is considering taking on a part time job that would result in 500$ a month pay. Undertaking such an activity would most likely wipe out most of the benefit received. Assuming 250$ are cut from the entitlement, the person’s real gain is only 250$. However, taxes reduce the gain additionally. If a 20% tax applies, the person is left with 200$. Travelling costs could easily cut 100$ more. Furthermore, if the person has descendants, caregiver needs to be hired and paid. After all the expenses are taken into account, the person would be worse off taking a job, that would actually be beneficial for the society and for that person, as it could be a stepping stone towards better income.

As discussed before, the general rule of taxation should be that only the undesired behavior is taxed. The scenario described by the poverty trap does precisely the opposite, as it taxes work and by doing that, it discourages people to work, creating a perverse intention. The welfare trap corners people, primarily young people, into living their lives completely dependent on the government subsidies.

One of the ways to avoid this trap is by introducing the unconditional basic income, paid to all permanent residents of the country regardless of their employment status. Some believe into a bit more elaborate system of negative income taxation, in detail described in chapter 4.1.1.4. However, it is worth pointing out that the welfare state in itself is not really a sustainable idea and the governments should try to start thinking what will come instead of “Leaving no one behind” policy.

4.2.2 Corruption

The definition of corruption according to Investopedia (Investopedia.com, 2012) is below.

> Corruption is dishonest behavior by those in positions of power, such as managers or government officials. Corruption can include giving or accepting bribes or inappropriate gifts, double dealing, under-the-table transactions, manipulating elections, diverting funds, laundering money and defrauding investors.

Corruption, by its very definition, means dishonest behavior by those in power. The poorest countries in the world are, invariably, the most corrupt ones as well. Corruption slows down economic growth (Johnston, 2009). In the second-machine age, the effects of corruption are becoming even more self-evident, as it is becoming increasingly easy for the rich to keep just getting richer without using the talent of the population.

According to the educational video (The School of Life, 2014), another way to look at corruption is by comparing it to the clan-based thinking. In some countries with clan-based thinking, when you are filling in a job opening, you are not meant to hire a candidate based on his qualification, simply saying, merit, but based on your relationship with the candidate. It is considered corrupt there to disregard your relative and pick objectively the best candidate. This thinking, especially on a much larger scale, causes deep disturbance in the society (Abdullahi, 2014). It is very important for every society to recognize that the practice of nepotism, or favoring relatives over others is a dangerous

practice. It denies access to the skill, expertise and talent of the whole society, which can be detrimental in the future. Of course, in terms of privately held family businesses nepotism cannot be considered wrong, as the person in question could be more then qualified for the position, but in certain societies nepotism poisons every aspect of its life.

Unless strong governmental institutions, which work transparently and with no corruption, are in place, the country cannot collect tax revenues, which hurts its ability to get the institutions it would need in order to prosecute criminals efficiently, invest in infrastructure and education etc. Lacking good institutions makes it impossible to escape the poverty trap nationwide. In this context the poverty trap implies the inability of the nation to collect sufficient tax revenues that would in return help to invest in better institutions; the very lack of those good institutions is the reason the country cannot collect sufficient revenues.

4.2.3 Complicated legal system

Another flaw for any country is an overcomplicated legal system, in particular with the relationship to taxation. According to the source online (Russell, 2016), the United States tax code has 74608 pages. If you think about this number, it becomes very clear that not only the lay people are incapable of comprehending it, but also even the experts of the field are unfamiliar with all the details and loopholes present in the legislation.

The tax code is just one of the examples of bloated legislation, many others can be found. Complicated legal systems create numerous challenges in many areas of the lives of people and for the government. For instance, with the tax code of that size any number of loopholes and contradictions can be found, that are fervently utilized by the rich, who can afford professional help with their tax returns (Christenson and Plymouth, 2016). A simple, straightforward legal system would make collecting revenue, prosecuting criminals and even just applying for a job significantly easier.

4.2.4 Halting progress

One approach to contain the negative effects of the second machine age that some believe could work is to try to halt progress. This can be done by, for instance, introducing legislation, which would prohibit replacing human workers with machines. According to

Brynjolfsson and McAfee, 2014, this would be as bad of an idea as locking all the schools. That would be a behavior of protecting the past against the future (Tomlin, 2012). The best it could bring is to ensure the status quo at the expense of progress. Doing so would also disrupt the very principles of democracy and the free market, where the companies have a choice whether they wish to hire people or not.

The technologies of tomorrow are actually capable of changing human lives for better, not for worse. Humans need to find the ways in which they can most benefit from using the technologies and not be afraid that the machines are going to take over all the tasks to do. The technology will take over most of the tasks humans are capable of and new jobs for everyone probably will not appear, however, in the long run it might not be such a horrible thing, depending on the moral course the society takes. If humans are smart about technology, its effect can make everyone's life better,

4.2.5 Destroying capitalism

Capitalism is far from being perfect. According to Kotler, 2015, capitalism proposes no solution to poverty, fails to pay minimum wage to many, creates economic instability and encourages consumption among other things. Nevertheless, according to Pettinger, 2009, capitalism allocates resources, generates innovation, rewards effort, creates financial incentives, and encourages efficient and dynamic production. In addition and perhaps most importantly, what would the alternative look like? There is no viable alternative to capitalism, at least so far.

In regards to keeping capitalism, it is also really important to think about the concept of wealth distribution, i.e. artificially evening the amount of money people have. According to Eldridge, 2015, the distribution of wealth is a completely legit and needed thing to do, as long as the distribution does not become a goal itself. Concisely, the government has to collect revenues for a plain reason that it needs to fund its expenditures. However, it is extremely problematic, according to the author, when the sole reason for increasing taxes is an artificial concept of social justice, something being supposedly fair. In fact, as discussed before, there are cases when increased taxation can actually lead to decreased profits by the government (chapter 4.1.1.2).

Top 20% of earners (Eldridge, 2015) pay about 80% of all the expenditures. It is extremely irrational to try to impose high tax rate for the sake of punishing the rich, as it actually cuts the revenue and serves a detrimental purpose to the government, since it destroys the incentive to work and to earn more. If the reasoning like “social justice” and “it is fair” on contrary to “this helps all of us” and “it is rational” are a part of the policy, then the country is doomed to have its development and progress undercut.

5 Study of the situation in the European Union and the United States of America

In order to assess the future and with reason generate a realistic scenario of the development of the world in the era of brilliant technologies, the political tendencies need to be examined, as politicians mostly determine the future course of the world. However, this part will not analyze the future from the perspective of the technological revolution; it is merely to assess the tendencies in the world so that later they could be compared with the advised policies and a scenario of development could be created.

The time when this work was written, first half of 2017, is, in many ways, a turning point for the development of the Western world, as 2016 was eventful compared to the previous years (Reporters, 2016).

5.1 The European Union

5.1.1 United Kingdom EU referendum

On 23 June 2016, the United Kingdom of Great Britain and Northern Ireland held a referendum on the membership in the European Union. The referendum resulted in the majority of voters backing leaving the European Union; the decision is currently being implemented by the new British government, who have triggered the exit process in the spring of 2017, putting the UK on course to leave the EU by the spring of 2019.

The markets immediately reacted negatively to the results of the vote, making 24 June 2016 the worst one day drop ever in absolute terms (David, 2016). The President of the European Commission Jean-Claude Juncker admitted after the vote that the single Europe project now faced an "existential threat". So far, it is difficult to say on what terms the United Kingdom will leave the European Union, as the negotiations are only starting; however, the economic figures tend to state that the decision will negatively affect both the UK and the Union. According to OECD, 2016,

> Membership of the European Union has contributed to the economic prosperity of the United Kingdom. Uncertainty about the outcome of the referendum has already started to weaken growth in the United Kingdom. A UK exit (Brexit) would be a major negative shock to the UK economy, with economic fallout in the rest of the OECD, particularly other European countries. In some respects, Brexit would be akin to a tax on GDP, imposing a persistent and rising cost on the economy that would not be incurred if the UK remained in the EU.

	Scenarios	Outcomes		Channels						
		GDP (% pts)	GBP cost equivalent per household	Risk premia	Confidence	Trade	FDI	Skills	Immigration	Deregulation
Near term: 2020		-3.3%	-2200	x	x	x			x	
Longer term: 2030	*Central*	-5.1%	-3200			x	x	x	x	x
	Optimistic	-2.7%	-1500			x	x	x	x	x
	Pessimistic	-7.7%	-5000			x	x	x	x	

Figure 7. OECD predictions of the impact of Brexit on the United Kingdom through channels and over time

OECD claims that even in the most optimistic scenario the effects of Britain leaving the EU are going to be negative for both parties involved. As mentioned in the quotation above, the organization compares Brexit to the tax on the GDP.

As the positive effects of Britain departing the European Union, the safety of borders is most often quoted, plus the fact that the laws of the country are only made in Britain, not on the pan-European level, however, few sources of data suggest that the isolationism policy is going to benefit the Kingdom.

5.1.2 Rise of far-right ideologies

Continuing economic stagnation across the Western world, refugee crisis and numerous terrorist attack in major European cities (5.1.3 addresses it in details) have all created a perfect background for the rise of far-right anti-establishment ultra-conservative groups.

In France, Marine le Pen of the Front National is predicted to continue to the second round of the 2017 presidential election (which did in fact happen). She stands for withdrawing from the EU, NATO and the Eurozone, as well as putting restrains on immigration. Despite the prediction that she is going to lead in the first round of voting (which she in fact failed to achieve), she is unlikely to win the presidency. Many have stated that may France elect le Pen as its leader, the European Union project is finished.

In Germany, the Alternative for Germany's rise was a surprised for many, as Germany is the country where populist parties usually do not get more than 5% support. The party

is anti-Europe and anti-Muslim. They are on course to become the first far-right party to win seats in the German parliament (Reporters, 2016).

In the Netherlands, the Party for Freedom was topping the polls and was expected to become the largest party after parliamentary elections in March. It finished second, however. PVV stands again immigration, including European internal immigration and calls to leave the European Union and the Eurozone.

In Austria, Hungary, Slovakia, Italy and elsewhere the ultra-right movements are also on the rise.

According to the article on theguardian.com (Polakow-Suransky, 2016), the success of the far-right movement is attributed to it stealing many of the traditionally leftist ideas and selling them as their own - from gay rights to women's equality and protecting Jews from antisemitism. The idea that was played so successfully is that the left, with its indulgence of Islam, poses a greater threat than the far right. Despite the attempts of the traditional political parties to mock and dismiss the ideas of the newly reborn populist movement, it is here to stay and is going to deeply influence politics over the course of many years to come. Mostly, these movements put a target on unregulated migration (mostly of low-skilled individuals) and on the spread and indulgence of Islamists.

5.1.3 Europe on alert after terrorist attacks

2016 was a year of many atrocious terrorist attacks. Mostly terrorists targeted Belgium, Germany and France. 32 people were killed in Brussels airport and on a metro station by suicide bombers, 86 people were killed in Nice by a man driving a truck in the group of people, 12 people were killed in Berlin by another man driving a truck in the group of people, echoing the Nice attack. These attacks are probably the ones having received most international attention.

These attacks have destabilized the governments of Europe and caused more uncertainty in the future for many people. Many countries have also tried to strengthen their security systems in order to prevent repetition of the attacks. Among other things, radical Islamic terrorism has led to deepening anti-Islamic sentiments and the rise of the populist parties around Europe.

5.1.4 Implications for the European Union

The events of 2016 have significantly weakened the Single Europe project and even those who endorse the idea of single Europe, like the President of the European Commission, acknowledge that. It has become largely uncertain whether the quickly rising eurosceptics will get it their way and more and more countries will choose to secede from the EU, eventually causing the European Union to fall apart. Furthermore, it is also largely uncertain what the destiny of the European continent would be, may such an event happen, as single Europe rendered war impossible on the continent.

However, there are a number of sources claiming that the rise of populist movements might not mean the end of the European Union (Bershidsky, 2016). Despite that, for many it has become doubtless that unless the European leaders start to pay attention to their people's wishes closer and try to modernize the Union, the EU is living on a borrowed time (Robinson, 2016).

5.2 The United States of America

On November 8, the United States of America held the 2016 Presidential election. Donald John Trump, an American businessman and television personality, was elected the 45th President of the United States and Michael Richard Pence was elected the 48th Vice President, with Trump becoming the first president in history of the United States to be elected without any prior political or military experience. The result of the election is considered one of the most shocking events in American history, with most media companies and polling experts considering a Trump victory unlikely. Some considered the result highly controversial due to the statements Donald Trump made during his presidential campaign and Hillary Clinton's popular vote lead of nearly 3 million votes. The next day after Donald Trump's victory, protests erupted across the United States and the world.

On January 20, Donald John Trump was sworn in as the President of the United States, the next day the largest protests by the number of the participants in the history of the United States occurred (Raff and Waddell, 2017). It is worth noting that the Donald

Trump's victory of the presidential bid is actually deeply in line with the political upset and the rise of reborn far-right around the world (part 5.1.2 addressed the European example). Furthermore, going through economic policy proposals of President Trump is essential for understanding the future of the Western World, especially since at the time when this work was written, Donald Trump has been President for a very short period of time.

5.2.1 President Trump's policy proposals

Probably the most important thing about the 45th POTUS is that he ran on the promise of rebuilding America and creating more jobs. In the third presidential debate between him and Hillary Clinton (NBC News, 2016) he stated:

> I'm going to create tremendous jobs. And we're bringing GDP from, really, 1% [growth rate], which is what it is now, and if she got in, it will be less than zero. But we're bringing it from 1% up to 4%. And I actually think we can go higher than 4%. I think you can go to 5% or 6%. And if we do, you don't have to bother asking your question, because we will have created a tremendous economic machine once again, the likes of which we haven't seen in many decades. And people will again go back to work, and we'll have companies that will grow and expand and start from new.

Donald has said on the record statements like "Our jobs are fleeing to Mexico" and "Bring back jobs from China & Mexico" (OnTheIssues, 2016). President Trump argues that the problem is that American jobs are leaving the United States and are moving to Mexico. However, some scholars disagree (Brynjolfsson, E. and McAfee, A., 2014, Chapter 11) and state that

> It's not that American workers are being replaced by Chinese workers. It's that both American and Chinese workers are being made more efficient with innovation. As a result, both countries are producing more output with fewer workers.

The very message of Brynjolfsson's and McAfee's Second Machine Age is that routine and well-structured tasks are easy to automate and replace by the machines. Ironically, Trump is considered to have won by appealing to the frustrated workers in states like Pennsylvania and Wisconsin, which used to be doing those kind of manual jobs. How he is going to satisfy his promise to them is quite unclear.

According to OnTheIssues, 2016, Donald said that he was going to reduce taxes from current 35% to 15%, as it would be a job creator. “Any business of any size will pay no more than 15% tax”. Interestingly, the same source claims that before starting his presidential bid Trump claimed that “0% corporate tax would create millions of jobs”, however, he did not make any similar statements during his campaign and it is unlikely he would even consider pursuing 0% corporate tax policy.

Furthermore, Donald Trump promised to get rid of illegal immigrants currently residing in the United States and to curb legal migration. He is opposed to abuses in work visa program, such as bringing unskilled immigrants. His position on high-skilled immigration is not completely transparent, however (Karnik, 2016).

President Trump also talked about introducing tax imports when U.S. companies manufacture abroad and import to the United States. He is against free trade and wants to impose taxes on imported goods. He says that “NAFTA was worst trade deal ever; TPP is a close second” (OnTheIssues, 2016).

Donald Trump’s position on minimum wage is quite ambiguous. On one hand, he is a long known advocate of not raising it and known by saying “Don't raise minimum wage; it makes us non-competitive” and “Don't raise minimum wage, but create more opportunities”. Nevertheless, more recently, he questioned “How do people make it on $7.25?” and called to “Raise state minimum wage!” (OnTheIssues, 2016). The later, however, could be interpreted as a campaign stunt.

5.2.2 Implications for the United States

Most likely, the Trump administration is going to implement most of the policies that Donald Trump ran on, as was seen from the first days of his administration. Lowering the tax for businesses and creating a tax heaven to return for offshore firms will surely stimulate economic growth and will create numerous jobs. Most likely, President Trump will push a typical Republican agenda of keeping the minimum wage low, which also sparks new workplaces due to less strict regulations.

However, most experts also believe that Trump tax plan could add trillions to the debt, despite President’s claim that it will not (Gleckman, 2016). Possibly, Trump’s efforts to limit jobs escaping the United States could succeed and appeal to his base, despite

scholars stating clearly that these jobs are doomed eventually due to automization. Renegotiating trade deals could also benefit America deeply, despite the policy of greater isolationism being a huge mistake. Limiting illegal immigration and curbing low-skilled immigration are definitely also long-due and could help the United States, as low-skilled individuals cannot have a place in the era of brilliant technologies and would just be parasites of the society.

To sum up, only time will show if Donald Trump is going to be a successful president and is going to help America achieve greater prosperity. Most likely, having done similar analysis, he understands the importance of the things he proposed and is going to pursue them throughout his tenure as president, especially, if he is interested in being re-elected for the presidency in 2020.

6 Realistic scenario of the development

"Many years from now, then, high-performing, non-thinking machines will outperform the best human experts, and do so in quite unhuman ways" - claim Richard and Daniel Susskind in *the Future of Professions*. (Susskind and Susskind, 2015, chapter 7.2). They also believe that the phenomenon called technological unemployment is coming, no matter what we do. The scale of it is an unclear variable, though.

The consulting firm Deloitte claims that automation has wiped out 800 000 jobs since 2000 in the United Kingdom. They state that in the next decade up to 11 000 000 jobs can be eliminated, which is a third of all the jobs in the country. McKinsey seems to agree, stating that 45% of all American jobs can and will be automated in the near future (Chui and Manyika, 2015). That concerns 55 000 000 people.

So, is that it? Are the technologies going to conquer the world and make human labor completely irrelevant? Is the pessimistic scenario of development the one we should be looking forward to? The answer is yes. The only slim chance to avoid it is to adequately and proactively react to the changes.

Currently, in no country in the world is there a secretary or a minister of all this new technology, who would be responsible for redefining the job market in the face of technological unemployment. There exist few to no governmental committees responsible for researching the effects of innovation and automation and for researching the ways to minimize the negative effects of the given automation. Currently, no government is equipped to deal with the innovations of tomorrow comprehensibly (Watson, 2016).

The policy recommendations, presented in this work, come from various sources, however, they all have deep economic standing and, if implemented, to the knowledge of some of the best economists of the world, would redefine the economy and make the lives of most people much fairer and better. Some of the policies proposed could be considered relatively harsh and could create chaos and temporary hardship for some, but in the long run it will not have mattered, as the longer-term objective to create prosperity will have been achieved.

The biggest problem our world is facing right now is the failure by politicians to comprehend the dangers the second machine age could cause, unless correct measures beforehand are implemented. The global warming is not the most pressing issue of today. The transformation caused by the technology of tomorrow is far more important. Furthermore, the most recent trends on the political arena go against the recommendations, made by the author of this thesis. This is especially true in the European Union, as the right-wing movements seek to undo some of the accomplishments of recent years. The author in no way states that those movements are detrimental to the freedoms, they could on contrary prove to be deeply advantageous, as, for instance, those movements seek to protect individuals from radical Islam. Also, only time can show if the European continent is in fact better off without the European Union. Furthermore, the author does not rush to criticize the administration of Donald Trump either, at least based on the available information. The president, in fact, at least tries to address the issue of jobs disappearing, however focuses on the wrong reason.

Overall, neither Donald Trump nor the far-right in Europe seem to be at all focused on the jobs being automized. If our leaders do not act proactively in terms of the future of technology, the transformation of the workforce is going to be far more painful for more individuals and is going to leave more people in the “loser” camp, i.e. those, who got replaced by the intelligence of machines. The destiny of those people and, to that extent, their need for existence are largely unclear.

Technology is the future. There is no other way.

7 Conclusion

It might be one of the greatest and the oldest dreams of mankind - that someday all our material needs will be fulfilled without having to struggle doing a job. For most of the history, it was nothing more than a dream. However, our generation is very different. We actually can imagine a machine doing almost any task for us. The cost of material items is constantly decreasing and the promise of more complex 3D printing can bring the marginal cost of living close to zero. We have achieved so much already in the realm of brilliant technologies, but the Moore's law tells us that it is just a start, most of our gretest accomplishments are still ahead. In the next two years, we will add more computing power than we currently have. Perhaps, our generation will witness the most amazing event in all of human history - the appearance of a truly intelligent machine.

Nevertheless, there exist more than one scenario for the development of our humanity. It deeply depends on the choices we make over the coming decades. Until recently, humanity did not have a power to destroy itself. Today it does. Technology gives more and more power to the hands of more and more people. Technology comes and brings dozens of unexpected effects on our lives in addition to the ones that are anticipated. We can predict what is going to happen and how people will be effected by the machines and what will happen to labor, but we will never know that for sure, until it happens.

Moore's law is driving a computer to more and more computing power. One day, in not so distant future, a computer with more capacity than a human will appear. What comes next, after this happens, is almost impossible to predict. What will an intelligent machine be like? Will we ever understand human consciousness? What is consciousness? Can we replicate mind? Is it possible to create a digital mind?

It is crucial to remember that with humans being able to do more and more with the help of technology, our values come into play. How would we distribute wealth created by intelligent machines? Will everyone have the same opportunities to enjoy the best in life? One day, answering these and many other similar questions might become even more important than constant innovation.

We have the key to our paradise. We also have the key to our ultimate demise and destruction. It is up to us to choose the door.

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