

# Government and AI



## Yuval Harari

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**Abstract:** Professor Yuval Harari, in his lecture Government and AI, talks about how governments around the world should be concerned about new technologies in order not only to regulate them but also to somehow protect their citizens from the possible problems that may arise, such as monitoring and loss of privacy.

**Keywords:** AI, government, algorithm, data



**YUVAL HARARI:** Do you hear me now? Technology sometimes works. It's a great pleasure for me to be here today with you and I would like to use this opportunity to talk to you about what the government can do about the AI revolution. The revolution of artificial intelligence will, in the coming decades, change the human economy, will change the political system, will even probably change our own bodies and minds and there is a lot of responsibility for governments to do something about the dangers inherent in this development.

There are three particularly important things that governments should do. Governments should protect citizens from the economic shocks of the AI Revolution. Governments should protect citizens from the political dangers inherent in the AI Revolution and governments should also build global cooperation to help protect humanity as a whole, all over the world, from the existential threats that the AI Revolution poses to our species, to Homo Sapiens.

So let's begin with the first government task, which is to protect citizens from the economic shocks. Nobody really knows what the economy and the job market would look like in 2050. Except that they will be completely different from today. AI and robotics would likely change almost every profession. Many, if not most, jobs that people do today will disappear or change fundamentally by 2050. Of course, as old jobs disappear, new jobs are likely to emerge. But we don't know if enough new jobs will emerge and the really big problem will be to retrain people to fill the new jobs. Suppose you're a forty-years-old truck driver and you lose your job to a self-driving vehicle. There is a new job in designing computer code, or perhaps in teaching yoga. But how does a forty-years-old truck driver reinvents himself or herself as a yoga teacher or as a software engineer? And even if you do manage to retrain yourself to fill the new job, this will not be a long-term solution. Because the automation revolution will not be a single watershed event, in which the job market will settle down into some new equilibrium.

Rather, it will be a cascade of ever bigger disruptions. It's not that we'll have the big AI Revolution by 2025 and then we have a couple of rough years when everybody adjusts and then it's all over. No, we are nowhere near the full potential of AI. It's just the beginning. So, we will have a major automation revolution by 2025. But then an even bigger one by 2035 and an even bigger one by 2045. All jobs will disappear. New jobs will emerge, but the new jobs too will constantly change and vanish. So, people will have to retrain and reinvent themselves, not just once, but over and over again throughout all their lives. Governments will probably have to step in and help people manage the difficult transition periods. Both by providing generous unemployment benefits and also by helping to pay for all the retraining or adult education.

Just to think, in the 20th century, governments built massive systems of education for the young. In the 21st century, they will have to build massive systems of education for adults. And even that, may not be enough. Because the biggest problem of all is likely to be psychological. Even if you have the financial support necessary to reinvent yourself at age 40, it's unclear whether you will have the mental resilience.

Change is always stressful. Reinventing yourself at age 40 and again at age 50 and again at age 60 might be too much for many people, too stressful. So even though it's very clear that many new jobs will appear by 2050, we might nevertheless see the creation of a new class, a massive new class, the useless class. People who are useless, not from the viewpoint of the friends and family, nobody's ever useless from the viewpoint of their loved ones, but rather, people who are useless from the viewpoint of the economic and political system.

In the past, people had to constantly struggle against exploitation. The big struggle in the 21st century might be the struggle against irrelevance. When confronting this crisis, the government's motto should be "don't protect the jobs, protect the people". Help them retrain and reinvent themselves and find new jobs. If governments fail this mission, the result will be not only the concentration of wealth in very few hands, but also concentration of power in the hands of a tiny elite. If you think, for example, about the transportation market.

So today, millions of taxi drivers and bus drivers and truck drivers own a small, each of them, owns a small share of the wealth and power of the transportation market. They earn their living from it and they can also unionize and go on strike to advance their interests. Now, fast forward 20 or 30 years and we might see a situation in which all this wealth and all this power is owned by a few billionaires who own the corporations, who own the algorithms that drive all the vehicles. So not just the wealth! Think about Uber without having to pay anything to any driver, because all the cars are self-driving.

But also think about the billionaire who owns the company, that the workers cannot go on strike and paralyze the transportation market because algorithms never strike. But the billionaires, if something happens that they don't like, they can press a button and immediately shut down the entire transportation market. The result might be the most unequal societies that ever existed. The AI Revolution might create unprecedented inequality not just between classes, but also between different countries. We are already in the midst of an AI arms race with the USA and China leading the race and most countries left far behind. If we aren't careful, we'll see a repetition of what happened in the 19th century with the industrial revolution. In the 19th century, a few countries, like Britain, France and Japan, industrialized first and they were then able to conquer, dominate and exploit the rest of the world.

The same thing might happen again in the 21st century with AI. Countries that don't take action now, might lose control of their future. In 1840, Britain was building railroads and steamships. Many other countries said "we don't care about steamships or railroads, we have much more urgent problems to deal with". 30 years later, these countries were British colonies. Nowadays, all countries, even the poorest ones, should care deeply about the AI race, because it is likely to shape their own economic and political futures. It is very likely that the AI Revolution will create immense new wealth in high tech hubs, like the United States and China, where the worst effects will be felt in developing countries. In the 20th century, developing countries could usually make economic progress by selling the cheap labor of their unskilled workers.

But if automation reduces the demand for unskilled labor, and if developing countries lack the resources to retrain the workforce, what will they do in the 21st century? There will be more jobs for software engineers in California or Shanghai, but fewer jobs for textile workers and truck drivers in Honduras or in Bangladesh. Whenever people ask what will be the impact of AI on the economy or on the job market, you always have to remember, it will have very different impacts on different countries. It's not going to be the same all over the world.

The end result might be that most countries will be colonized by the leaders of the AI Revolution. Just as industrialization led to imperialism, so automation might lead to a new kind of imperialism or colonialism. In the 19th century, the industrial revolution in countries like Britain was fueled by exploiting the raw materials of many other countries around the world, like Brazil. This might happen again with data. Data is now the raw material of the AI Revolution and the vital data that is fueling the development in the United States, China and the other leading AI powers, is coming from all over the world. But the resulting power and wealth is usually not distributed back.

Governments, in these countries, needs to take action now before it's too late. The second important role of government is to protect citizens from the political dangers of the AI Revolution. The political threat can be summarized by a single equation, which might very well be the defining equation of the 21st century:  $B \times C \times D = AHH$ . Which means: biological knowledge multiplied by computing power multiplied by data equals the ability to hack humans.

The merger of Infotech and biotech, which are technologies like biometric sensors, means that very soon, at least some governments and corporations will know enough biology, have enough computing power and will have enough data to systematically hack millions of people. What does it mean to hack humans? Means to create algorithms that understand us better than we understand ourselves.

These algorithms can then predict our feelings and decisions, can manipulate our feelings and decisions and can ultimately make decisions for us or replace us all together. In order to do all that, the algorithms will not have to know us perfectly. That's impossible. It's impossible to know anything, let alone a human perfectly. But the algorithms will not need to be perfect. They will just need to know us better than we know ourselves, which is not impossible because most people don't know themselves very well. Quite often, people don't know the most important things about themselves. I know this for my own personal experience. It was only when I was 21 that I finally realized that I was gay, after living in denial for quite a number of years. I keep thinking about the time when I was 15 or 16 and I asked myself how I could have missed it, should have been so obvious. I don't know how, but the fact is that I did miss it, perhaps because I grew up in a very homophobic society. But that's hardly exceptional. Lots of gay men spent their entire teenage years not knowing something very important about themselves.

Now imagine the situation: in a few years when an algorithm can tell any teenager exactly where he or she is on the gay-straight spectrum just by collecting and analyzing data. One way to do it might be to track eye movements. The computer could track my eye movements and analyze what my eyes do when I see a sexy guy and a sexy girl walking in swimming suits on the beach. Where exactly do my eyes focus and where do they linger? As I walk down the beach, on the street, or as I surf the web or watch television, the algorithms could discreetly and continuously monitor me and analyze me and hack me in the service of the government or of some corporation.

Maybe I still don't know that I'm gay, but Coca-Cola already knows it. It knows it before me. So next time Coca-Cola shows me the advertisement for some new drink, it chooses to show me the version with the shirtless guy and not the version with the girl in the bikini. And the next day when I go to the store, I choose to buy Coke rather than Pepsi and I don't even know why.

But Coca-Cola will know and this information will be worth billions. This information could of course have far more serious consequences. In Iran, for example, there is a death penalty for homosexuality. What would it mean for a gay man in Iran to be detected and hacked by government algorithm? Everybody has some secrets. Of course, not everybody is gay, but everybody has some secrets. A lot of secrets worth knowing. To protect people against these dangers, governments should first and foremost restrain their own powers. In the 21st century, every government on Earth will face the temptation to build these total surveillance systems to monitor their own citizens. Even if you are not highly developed, you could always buy it from China or from the United States or from some other developed country.

Governments must resist this temptation. Otherwise, the result will be the creation of the worst totalitarian regimes that ever existed. Regimes far worse even than Nazi Germany, of the USSR. Of course, it is not enough. For governments to restrain their own use of such technology, it's also important for the government to protect its citizens from foreign governments and from foreign corporations, who might use this technology to hack their own citizens.

Even if the government of Brazil does not create a total surveillance regime to monitor its citizens, Brazilian citizens might still fall victim to surveillance by the Chinese, American or Russian governments, or by big powerful corporations like Amazon, Baidu, Facebook or Alibaba. Just try to imagine again, fast-forward 20 or 30 years. Just try to imagine Brazilian politics in 2050.

When somebody in Beijing or in San Francisco has the entire personal and medical records of every politician, journalist, judge, military officer, say people who are now 15 or 16 and live online and constantly monitored, in 30 years they are candidates in an election, or they are candidates for the Supreme Court, and somebody has their entire sexual record from when they were 20. The reputation of almost no person can survive this, so their fortunes, their future is in the hands of these outside systems. Whether the country is still independent under such a scenario or whether it became a data colony, it's a difficult question. If you have enough data, you can control a country without needing to send armies and soldiers from abroad. To prevent this, governments need to regulate the ownership of data. Who owns my personal data? Who owns my medical data?

For that we first need to realize the data is now the most important asset in the world. In ancient times, land was the most important asset. Politics was the struggle to control land. If too much of the land was concentrated in the hands of a single individual, like a big emperor or of a small aristocracy, then you got a dictatorship. In the last 200 years, machines and factories replaced land as the most important asset. Politics became the struggle to control the machines, and if too many of the machines were owned by the government or by a few corporations or a small elite, that was a modern dictatorship.

Now, data is replacing both land and machinery as the most important asset in the world, and politics is increasingly becoming about controlling the flow of data in the world. If too much data is controlled by the government or by a few corporations, then we will see the emergence of a new kind of dictatorship: digital dictatorship. The problem is that we don't really have a working model for regulating the ownership of data. We have thousands of years of experience regulating the ownership of land. We have a couple of centuries of experience in regulating the ownership of machines and factories and preventing overconcentration.

But we have almost no experience in regulating the ownership of data. That's a very great challenge to engineers, to lawyers, to philosophers. But above all to governments, because it is their job to regulate the ownership of data. It's not something that we can rely on the corporations to do for us. After all, these corporations don't really represent anybody, we didn't vote for them. The countries that lag in the AI arms race obviously have the greatest incentive to regulate the ownership of data and the power of AI. To do so effectively, many countries will have to cooperate. By itself, Brazil will probably not be able to resist the USA, China, Google and Baidu. But if Brazil joins forces with other countries such as Argentina, South Africa, India, and the European Union, then such a block has a far better chance of regulating the ownership of data, as the development of surveillance technology in the AI across the world.

That brings me to the third important mission of governments in the face of the AI Revolution. Governments should create effective global cooperation, because only global cooperation can deal with the existential threats that AI poses to humanity. As I mentioned, we need a global agreement on surveillance and the ownership of data. Similarly, we need a global safety net to protect all humans against the economic shocks that AI will likely unleash. Automation will create immense wealth in some countries while ruining other countries. Unless we find solutions on a global level to the disruptions caused by AI, then entire countries might collapse and the resulting chaos, violence and waves of immigration will destabilize the entire world.

The poorer countries will not be able to handle it by themselves. Global Cooperation is also necessary to prevent the development of dangerous new weapons, like autonomous weapon systems. No nation can do it by itself because no nation controls all the scientists and engineers in the world. If you think about the current arms race in developing autonomous weapons systems, killer robots, perhaps the most dangerous technology presently developed by the arms industry, almost every country will say this is a very dangerous technology. Robots. We don't want to develop it. We are the good guys. But we can't trust our rivals not to do it, so we must do it first.

We must do it before them. If we allow such an AI arms race to develop, it doesn't matter who wins the arms race, the loser will be humanity. The only thing that can prevent such a dangerous arms race is not building walls between countries, which is currently in fashion. But rather building trust between countries, and that's not impossible. If today, for example, the Germans come to the French and tell them "trust us, we aren't building killer robots in some secret laboratory under the Alps", the French are very likely to trust the Germans, despite the terrible history between these two countries. We need to build such trust globally. We need to reach a point when China and the US can trust each other like Germany and France. We are running in the opposite direction at the moment, but it's not impossible.

Technology poses a threat, a challenge. Not just to the global economy and to global peace, but also to the very meaning of humanity and to the most basic rules of life. For 4 billion years, nothing fundamental changed in the basic rules of the game of life. For 4 billion years, whether you were an amoeba or a dinosaur, a tomato or a homo sapiens, you were subject to the rules of organic biochemistry because you were made of organic compounds and you evolved according to the rules of natural selection. These were the two rule systems that every organism was subject to. Organic biochemistry and natural selection. But in the 21st century, natural selection is likely to be replaced by intelligent design. Our intelligent design will be the new driving force of evolution.

At the same time life might also break out of the limited organic realm into the vastness of the inorganic realm. We might begin to design and manufacture the first inorganic life forms. After 4 billion years of organic life shaped by natural selection, we are about to enter the era of inorganic life shaped by intelligent design. In the process our own species, Homo sapiens, will likely disappear.

In 200 years or so, it is very likely that planet Earth will be dominated by entities which are far more different from us than we are different from chimpanzees. It's not that we'll destroy ourselves, we will change ourselves dramatically. Today we still share it with chimpanzees. Most of our bodily structures, our physical abilities, our mental faculties. But within 200 years, the combination of AI and bioengineering might completely transform our bodies, our brains and our minds. Consciousness itself might be disconnected from organic structures. Or alternatively, we might witness the decoupling of consciousness from intelligence. Intelligence is the ability to solve problems. Consciousness is the ability to feel things like pain and pleasure and love and hate in humans and all other animals. They go together.

But in 200 years, Earth might be dominated by superintelligent entities which are completely non-conscious. How should we deal with these mind-blowing developments? We might make mistakes on a cosmic scale, and if we make such mistakes, nobody will intervene to save us.

In particular, governments, corporations and armies are likely to use the new technologies to enhance human skills that they need, like intelligence and discipline. While neglecting other human skills like compassion, artistic sensitivity and spirituality. The result therefore might be the creation of very intelligent and very disciplined superhumans who lack compassion, lack artistic sensitivity and lack spiritual depth. We could lose a large part of our human potential without even realizing we had it. Instead of upgrading humans, technology will downgrade us.

To make wise decisions, we need to think in global terms about the interests of the entire human species and indeed of the entire ecosystem, rather than focusing on the immediate interests of a particular corporation or a particular nation. Nationalism doesn't need to prove an impossible barrier for such global thinking or for such global cooperation. I know that some politicians like the US President argue that there is an inherent contradiction between nationalism and globalism, and that we should choose nationalism and reject globalism. But this is a fundamental mistake. There is no contradiction between nationalism and globalism.

Because nationalism is not about hating foreigners. Nationalism is about loving your compatriots. In the 21st century, the only way to safeguard the prosperity and security of your compatriots is by cooperating with foreigners. No matter what the situation was before. In the 21st century, good nationalists should also be globalists. Globalism doesn't mean abandoning all national loyalties and traditions. It doesn't mean opening the border to unlimited immigration. Globalism means far more modest and reasonable things. First of all, it means a commitment to some global rules. Rules that don't deny the uniqueness of each nation, but rather regulate the relations between nations.

A good model for how to do it could be the football World Cup. The World Cup is a competition between nations and people often show fierce loyalty to their national team.

But at the same time, the World Cup is also an amazing display of global harmony. Brazil cannot play football against France unless Brazilians and French first agree on the same rules for the game. That's globalism in action. If you like the World Cup, you're already a globalist. Even if you can win the cup by drugging your football players, you shouldn't do it, because if you do it then everybody will copy your example and very soon the World Cup will be a competition between biochemists. While the sport will be ruined.

So like in football, also in economics, we need to balance national and global interests. Even in a globalized world, the vast majority of the taxes you pay will still go to provide healthcare, education and security to people in your country. But sometimes nations will agree to slow down their economic development and technological development in order to prevent catastrophic climate change and to prevent the spread of dangerous technologies. To conclude, then, the AI revolution presents governments with unprecedented challenges. But I want to stress that the various frightening scenarios I've mentioned are not prophecies. They are just possibilities. If you're afraid of some of these scenarios, you can still do something about it. Because one of the most important things to remember about technology is that technology is never deterministic. We can always use the same technologies to create very different kinds of societies.

For example, in the 20th century, people used the same technologies of trains, radio and electricity, to build different kinds of societies: communist dictatorships, fascist regimes, liberal democracies, they were all built with the same technology. You can actually see the differences from outer space. That's an image taken from a satellite in outer space of East Asia at night. You see here, South Korea is a sea of light. China is another sea of light, and in the middle, the dark patch is not the ocean. It's North Korea. You can literally see the difference between South Korea and North Korea very easily from outer space. The difference isn't technological.



It's not that South Korea knows about electricity and the North Koreans don't have this technology. They both have access to exactly the same technology, but they chose to do very different things. It will be the same with the new technologies of the 21st century. The twin revolutions of Biotechnology and Information Technology will certainly transform the world, but they don't have a single deterministic outcome. We can use these technologies to create either heaven or hell. How to use them wisely is maybe the most important question facing us today. I hope very much that you in your future careers and in your future life will help us make good and wise decisions. Thank you.



**DIOGO:** Thank you. Now let's choose some questions that you sent to Yuval. Professor, thank you very much for the presentation. I think it's very provocative, especially talking to a group of civil servants who are actually working in government and have to be aware as citizens and as civil servants of the consequences of technology on government. But given that, I'll ask you this question. Should the government innovate less? We are in the week of innovation in public service and a lot of what we've been discussing for the past few days is exactly how to introduce new technology to the government. Is that a threat, however, to society?



**YUVAL:** No, I mean, you need to adapt to the changing conditions of the private market of society. It's very dangerous if the government does not innovate and remains behind because it has a very crucial role it needs to regulate all these new technologies and for that it needs to understand them. Of course we should also expect the corporations and the engineers who are developing the new technologies to be responsible in how they do it. But ultimately, the real responsibility is of the government because it has the power to do so and it has the mandate from the citizens. We didn't vote for the engineers. We didn't vote for the entrepreneurs or for the billionaires who owned their corporations. We vote for the government in the hope that it will protect the interests of the citizens in this fast changing world.



**DIOGO:** I think there's a question about what kind of stories that we should tell ourselves and someone is asking if the tale of pessimism - and I don't think you consider yourself a pessimist -, but if the tale of pessimism also can bring bad consequences to society, to how we see ourselves and if we should have a story of aspiration of optimism somehow.



**YUVAL HARARI:** I think we should be realistic above all. I mean pessimism, yes, I mean, if you just go and spread prophecies of Doom and say there is nothing we can do, then this causes despair. When I go and give such talks in different places, I focus on the negative scenarios. Largely because there is a division of labor in the Academy, in scholarship. You know you have all the engineers and the people in the computer science department and the entrepreneurs developing these technologies. So naturally, they focus on all the positive potential outcomes and all the promises, especially if you need to raise investment for your startup, you won't go and tell the investors all the terrible things that can happen from your invention. Because they focus mostly on the positive scenario, it becomes the job of historians, philosophers and social critics to warn people about the dangerous scenarios. But not in a kind of doomsday prophecy that we are all lost. There is nothing to do but just to raise alarm about dangerous possibilities in the hope that we take action to prevent them.

I focused a lot, for example, in the use of AI to create surveillance regimes. But AI can be used in different ways. The same technology can be used by dictatorial governments and big corporations to monitor the citizens and the customers, but you can develop the technology that works the other way, that monitors the corporations and the government in the service of the citizens. AI can work both ways. For example, if you think about a problem like corruption in government. Let's say that the politicians appoint their relatives and cousins to all the jobs. For a private citizen, to monitor that it's very difficult, even if I have legal access to the information, I don't have the time and ability to go over all the names and see who is related to whom and so forth. But if you build the right AI system, technically it's extremely easy to build an AI system that simply monitors who is appointed in the civil service and the government should be open knowledge to the public, and so it's quite easy to know who is related to whom, in what way, and as a private citizen, you can just go to the computer, type the name of a politician or Minister or whatever, and immediately see all the relatives he or she appointed and compare different politicians for example. AI can also do that. In most dictatorial regimes you will never encounter such a tool. But it depends on what kind of technology to develop and how to use it.



**DIOGO:** Do you think that, in an opposite sense, big tech should be favored over smaller startups, given that big techs are usually easier to regulate and control, they are more responsive to social control and to government control? Facebook is easier to manage than 4Chan or 8Chan and they're usually also less innovative. Facebook and Google have been innovating by buying smaller startups. Do you think that there should be a higher entry barrier for startups and that the government should have policies that favor those well manageable, bigger companies?



**YUVAL HARARI:** Of course there are also huge dangers to the big corporations, both by lobbying and undermining government, or even taking over governments. Also the enormous concentration of data in power in one place is extremely dangerous. I don't think that there is an inherent vantage or that the government should prefer the tech leviathans over the small new companies. The key is really not the size, but the policies. Again, here the problem is that the government, I think, never encountered this problem to such an extent. Technology changes so fast. By the time that the government understands the new technology, its implications, thinks about regulation and then you have to pass legislation. By the time all this process is complete, the technology has changed three or four times.

The regulations may not be relevant anymore. For instance, one danger that we are facing - in all countries, not just dictatorial countries, also in free democratic countries - is that more and more decisions about our lives will be, and already are taken, by algorithms. I don't know how it is in Brazil, but in many countries you apply to the bank to get a loan and your application is not processed by a human banker, it's processed by an algorithm. The algorithm decides whether to give you a loan or not. Let's say the algorithm said no, don't give this person a loan. You go to the bank and you ask "why not, what's wrong with me?" and the bank says "we don't know, the algorithm said no and we trust our algorithm." This is extremely dangerous because it means people are losing control over their lives. There could be so many biases written into the algorithm. We already have racist algorithms, sometimes unintentionally. One famous example was a self-driving car, an algorithm for a self-driving car, developed in Silicon Valley lately. It turned out that it recognizes white pedestrians more easily than black pedestrians. Why? Because the data it trained on driving around Mountain View and all these places in Silicon, there are very few black pedestrians there. Eventually it means that it is 10% worse at recognizing black pedestrians, which could in some future lead to greater fatality, more accidents. It's not even intentional. But how do we know if the algorithm is biased, say racially?

The EU has just passed a regulation or legislation that says that citizens have a right for explanation. If your fate, like a bank loan, if the decision was taken by an algorithm, you have the right to get an explanation from the bank. The bank can't just say "oh the algorithm said no." But here is the problem with the development of technology. It sounds good on paper. But the bank then just can say "ok, we can give you the explanation, here are 1,000,000 pages, a print out of all the data that the algorithm collected on you and based on that it found patterns and comparing you to a million other people, it reached the conclusion that you are not creditworthy". The thing is that algorithms just make decisions in a very different way than humans. A human banker, when it makes a decision, usually takes into account just four or five salient features.

Could be relevant features like your past credit history; could be a biased feature, like your race or gender. But humans can't take hundreds of factors into account. The big advantage of AI is that it is able to make a decision based on hundreds of different factors. Just giving people the right to an explanation, if you don't understand how the technology works, this legislation is really irrelevant.



**DIOGO:** What do you think of Facebook's proposal of having an oversight board, a sort of Supreme Court over the decisions of the CEO? You think these kinds of governance mechanisms could be a good or better solution, at least than others?



**YUVAL HARARI:** It's a step in the right direction, especially because of the fast pace of technological development. It will be very difficult for governments, at least in democratic countries, to effectively regulate these kinds of technological developments without some cooperation from the corporations, from the engineers. Because simply they are not at the forefront of the research, and they sometimes lack the necessary scientific and technical knowledge. I think it would be good. I don't think that Facebook is the enemy and we just need to fight it, but ultimately the responsibility is of the government and not of Facebook.



**DIOGO:** Someone's also asking what is the right balance between corporate power and government power in a global system.



**YUVAL HARARI:** I would trust governments more than corporations. Because corporations, again, they don't represent anybody. Nobody voted for them. Their loyalty to a large extent is ultimately to their profits and to their business model. Sometimes they have nice CEO's, but you can't rely on that. I don't think we should exclude corporations from the dialogue or fight them. But the ultimate responsibility for regulating these dangerous developments is of governments.



**DIOGO:** I know you don't consider yourself a technology pessimist again, but there is another sort of writers who alert of dangers of technology but, not of technological progress and speed up, but of technological slowdown, like Robert Gordon, Tyler Cowen, and others, who think that we're actually stagnating energy-wise; energy became more expensive; nuclear energy, which was a promise, became actually frowned upon. And when you look at transportation where you're actually moving slower than we used to move in the 70s because of the traffic and also the technology didn't advance that much. The Concord was abandoned in 2003. Do you see that there is, at least in society, a technological slowdown in certain areas that could also be of concern?



**YUVAL HARARI:** In certain areas, yes, but that's the way that the history of technology develops. That you have a breakthrough in a particular area and a lot of advances there, and eventually it slows down and there is a breakthrough in another area. So yes, in transportation in terms of flying between countries, we haven't advanced much in the last few decades. But then, instead of coming here by airplane, maybe in 20 years I can just be here as an hologram, as an avatar, and save the entire transport cost, the pollution and so forth. The thought that the progress should be linear - we invented an airplane and now there should be faster and faster and faster airplanes - it usually doesn't work like that. Sometimes the new development comes from a completely different angle, which makes this entire line of development obsolete.



**DIOGO:** We are a school of government and we teach civil servants. What would you say that our school should teach the next batch of civil servants to prepare them for the future?



**YUVAL HARARI:** A lot of things. Maybe the most important thing to realize is that nobody knows what the world will look like in 20 or 30 years. Nobody knows how the job market, how the economy would look like, how the political system would look like. The old model of education... We are giving students certain skills that they will then use throughout their lives, throughout their career. This is increasingly becoming obsolete, because you don't really know what skills civil servants or anyone will need in 2040 or 2050. The one thing they will need for sure is the ability to retrain themselves, reinvent themselves, and adapt to completely unknown situations and problems. I would say that the emphasis should be on that. The assumption that, if you teach a course on anything and you teach certain examples and skills, the assumption should be that by 2050 this may be completely irrelevant. What you really need is the ability to learn new things and deal with unknown situations. Like at the end of the year, a good exam, a good test will not be "Ok, for the entire year you've learned a particular skill; now solve these equations or tell me these facts that you've learned for the entire year." Rather, the best test is "here is an entirely new situation, which we didn't say anything about during the whole year, how do you go about learning about it and solving it?" So what you really acquire during the year is the skills of how to approach a new problem, and it doesn't matter in the test whether you solve the problem or not. The key question is what is your approach? How do you approach a new and unknown situation?



**DIOGO:** Very good. Do you think there are indicators that we should be looking at when we are modulating our optimism and pessimism? If there was a dystopia index, what kind of numbers should be included there for us to be aware of the dangers posed by the future?



**YUVAL HARARI:** Because I think that the key to solving most of our biggest problems is global cooperation, then one indicator of pessimism or optimism is what is the level of trust and cooperation in the world. If there is enough trust and cooperation, I think humanity can solve almost any problem, and can deal with almost any threat it faces. But if the level of cooperation and trust drops below a critical level, then this is a dystopian scenario. Just think about the 2008 financial crisis. Let's not talk about some futuristic AI scenario. Let's say that something similar to the 2008 financial crisis hits the world tomorrow morning. The world is completely unprepared for that, unlike in 2008. In 2008, when the crisis hit, the largest economies in the world were able to cooperate together to prevent the worst outcome because they trusted one another enough. Despite tensions and competition, there was enough trust. Now there is no such trust. Nobody, I think, would follow the USA on that today, in 2019. Basically, in the last three years, the United States, which was, for decades at least, claimed to be the leader of the world or the leader of the free world, basically came and said, "we are resigning, thanks, but we don't want this job anymore, from now on, we care about one thing only, which is ourselves." Nobody would like to follow a leader whose motto is "me first." And that's the situation we are in now. There is no alternative leader at present. I think the good thing is that the world should learn how to cooperate without American leadership, but this is also not happening.

My best hope is that the world will learn how to cooperate better without depending on the US. No matter what will be the result of the 2020 elections. The world just can't be in a situation where everybody waits every four years to see who the Americans elect this time. We need a much more robust system of global trust and cooperation, which doesn't depend on a single country. At present, we are running in the opposite direction. There is greater and greater distrust. This is cause for pessimism, but I hope that we can reverse this trend.



**DIOGO:** The level of trust in government in Brazil has been very low for the past few years - in Congress, in the executive power - and now there are efforts to regain this trust which is fundamental for cooperation. What do you suggest that the government can do to restore trust from society in itself?



**YUVAL HARARI:** I'm not an expert on Brazilian politics or society, so I can't really give any. In general, I think, we see it as a crisis all over the world. I think in a way, it's also a crisis of national unity, which we see all over the world. There is a lot of talk about the kind of resurgence of nationalism, but actually, what we see all over the world is a weakening of nationalism. As I said in my talk, real nationalism is not about hating foreigners, it's about loving your compatriots. There is no lack of hatred towards foreigners in the world.

But there is a growing lack of love towards your compatriots. Many of the leaders who portray themselves as nationalists are in this sense actually anti-nationalists. They actively and deliberately undermine the national unity in many countries with divisive policies and inflaming rhetoric. I think, for example, about the United States. In the United States today, Americans fear and hate other Americans far more than they fear and hate the Russians or the Chinese. The American National community is disintegrating and this is at the core of the crisis of government and democracy all over the world. This is something which should be much relatively easy to solve. It depends on leadership. Not leadership that sets itself the goal to divide and rule, and to divide society even further and inflame hate and fear between citizens, in order to bolster their power; but rather a leadership that sets itself the aim of trying to bridge these divisions. I really emphasize that good nationalism is about loving your compatriots.



**DIOGO:** Yuval, thank you very much. Our time is up. Thank you very much.

