

Jens V. Svendsen

Can the Internet Save the World?



An Essay on Global Governance

2022

Preface

The COVID-19 pandemic and Putin's invasion of Ukraine took us by surprise. Nothing is as before and we must start working on a new vision for the survival of humanity.

This paper is my contribution. Based on a lifetime of work with technology and society, it is my legacy to my grandchildren. "You are going to be OK, but most importantly for you: everybody else in the World will also be OK".

The paper is about the Planet turning into a global village using the borderless and trustless governance that is being programmed into the Internet, and about the exponential technology that will enable us to mitigate climate change and satisfy everybody's basic needs in a sustainable and equitable way.

I am not alone in believing that technological innovation can take us to a higher level of civilization:

The American physicist and futurist [Michio Kaku](#) argue that our planet can acquire the status of "[Global Civilization](#)" by the end of this century - provided that humanity avoids the worst pitfalls like a nuclear war.

"Global civilization" is a way of life that harnesses all forms of free energy on the planet and is capable of controlling weather, earthquakes, volcanic eruptions, tsunamis and ice ages to benefit the continuity of civilization.

This civilization is based on consensus and ends all economic, ethnic, racial and religious strife. It guarantees all the citizens of the world free housing, food, education, healthcare, transport, etc. It is a

civilization that has achieved a completely sustainable development and an unrestricted supply of energy. It builds spacecrafts that are able to make interplanetary journeys, runs mining operations in space and establishes colonies on nearby planets. The medical technology will be able to cure most known diseases, prolong life to hundreds of years and help people develop a more intelligent, stronger and adaptive species.

About the Method

Since I am unable to predict the future, I confine myself to describing the space, humanity can exploit in the construction of a new civilization, and to make qualified guesses about the first steps on the way.

Thus, the paper is not an “academic work”, but an essay about the complex relationships between society and technology.

In my narrative, it is a premise that we humans are fundamentally decent, because we, throughout our prehistory, have been selected through a process in which mainly the kindest survive ([source](#)).

Furthermore, I am convinced that the most equitable societies win the global elimination race, because they are the most efficient. War, disease, hunger, crime and ignorance weaken everyone, even those in power.

When I use expressions like “we must...”, it is because - despite the exponential technology - there is a need for a human subject. We must (!) mobilize all good forces to steer innovation in the right direction.

I refer to sources with the link “([source](#))”, but otherwise, the content expresses my own position and it is up to you whether you believe me or not. Since I want the text to be as short as possible, I [link](#) to our

shared memory "*Wikipedia*" whenever there might be a need for further elaboration.

It is a well-known issue that anyone, who wants to look into the future, tend to overestimate the impact of innovation in the short term - but also to underestimate it in the long term. So forgive me if I am a little too optimistic here and there - in the longer run, it will all come true - and more so.

This is work in progress, so make sure you are reading the newest version ([check my website](#)), and if you share my concern for the future and my belief in social innovation, please contribute by sharing your comments.



I am a Danish economist, architect and entrepreneur ([CV](#)).

I was born in 1946 into a life as a typical Scandinavian post-war child. Thanks to the Danish welfare model, I had a safe upbringing, received free education and health care, and can look forward to a safe old age. That's probably why I am a big fan of the equitable society.

I have taken an active part in the youth uprising of the 1970s, have lived in a commune and worked in Africa for many years.

Since we, in the 1970s, believed that inequity problems could be solved politically, I became more and more skeptical of politicians and began to take an interest in information technology..

I have taught at the Aarhus School of Architecture, worked as a physical planner, and served as director of a software company. As a side job, I have run a bar in Denmark and a real estate business in Mozambique.

Jens V. Svendsen

www.jenssvendsen.dk mail@jenssvendsen.dk

Content

Preface	1
Content	5
Part 1: The Real World Monopoly Game	6
Part 2: The Internet	15
Part 3: The Post-Industrial Era	21
Part 4: Man or Machine	32
Part 5: Token Economics	39
Part 6: From Shareholders to Stakeholders	47
Part 7: From Government to Governance	56
Part 8: Africa - The Continent of the Future.	67
End note	74

Part 1: The Real World Monopoly Game



Everyone, who has played *Monopoly*, knows that the game stops when a single player has won so much wealth that the other players cannot afford to pay their rent.

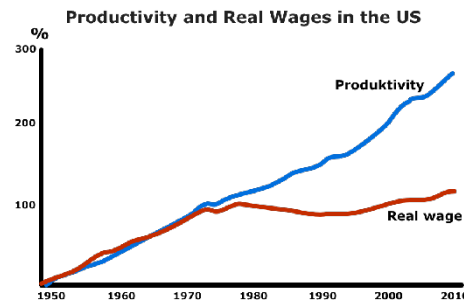
Now the real world is reaching this point. Huge fortunes have accumulated in the hands of a few extremely rich individuals ([source](#)) and the wealth gap has become so large that welfare policies no longer can bridge it. We must rewrite the rules of the game.

The Social Contract

The rules of the real world monopoly-game are written in a [social contract](#), which is the narrative that regulates the relationship between social classes such as workers, capital owners and peasants.

During the post-World War II period from 1945 to 1970, the societal surplus in most Western countries was divided equally between the

capital owners and the laborers. As a part of the deal, the wage earners financed - via their income taxes - a state apparatus that secured the infrastructure, educated the workforce, covered social security, and paid for capitalism's negative [externalities](#).



This graph illustrates the two post-war periods in the United States ([source](#)). In the first period, capital owners and laborers shared the benefits of increasing productivity. In the second period, real wages stagnated and capital owners got extremely rich.

Before the workers ran out of money, the finance world came up with a great idea: why not lend them money instead of paying them wages?

So, the banks increased the demand for goods and services by "printing" money and lending it to consumers. In the US, they used people's private homes as collateral and inflated housing values through a form of pyramid scheme. They created a bubble that burst with the [financial crisis](#) in 2008.

This ended the "Monopoly" game: The American middle class not only got paid less; they lost their savings and their homes were taken over by the banks.

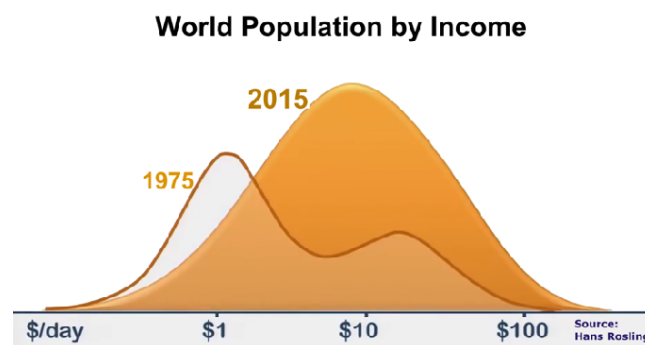
Nationalism vs. Globalism

My generation of Scandinavians can thank the welfare system for our safe upbringing and our good education and health; but we have also

experienced a welfare state that leaves little room for individual initiative and responsibility and is unable to deal with global inequities.

We are currently in the middle of a process where the political divide between *left* and *right* is blurred and supplemented with a divide between *nationalism* and *globalism*.

The Western left wing has no global strategy apart from support for national liberation movements and payment of charity to the poorest countries in the form of development aid. The [economic liberal](#) right wing, on the other hand, has been very successful with a globalization strategy that has radically reduced absolute poverty in the world and created a global middle class.



The planet is no longer divided into poor and rich. The population is following a normal distribution around a daily income of approximately \$10. The late Swedish statistician [Hans Rosling](#) has described the process as a development from a "camel world" with two humps to a "dromedary world" with just one hump.

Global Warming and the Global Middle Class

Climate change is happening at an exponential rate and there is no prospect that we can stay below the [Paris Agreement](#)'s target of 1.5 °C above preindustrial times. We risk reaching a irreversible [tipping point](#) in the climate system.

My own generation came up with climate strategies like [Nuclear Power? No thanks!](#), [Degrowth](#) and [Organic Farming](#); but they will likely prove to be inadequate at a planetary scale. Nuclear power is expensive, but kills fewer people than coal ([source](#)), degrowth is only a strategy to pursue in highly developed countries, and organic farming is a rather expensive and extensive form of food production.

In the short term, the only way to change people's behavior is raise the price of fossil fuels to reflect the full climate footprint and include the cost of recapturing the carbon emissions.

However, the political systems all over the world (even in China) have proven surprisingly reluctant to taking effective measures against climate change for fear of the population's reaction. On the contrary, it seems as if the political system opposes the green agenda: according to an [IMF Working Paper](#), the fossil fuel industry is subsidized with approx. \$ 6 trillion (about 7% of global GDP). It seems as if the increase in energy prices resulting from Putins invasion of Ukraine has been more successful in forcing the West onto renewable energy than political declarations.

But regardless of what Putin and the other politicians do, the energy sector will be disrupted by solar, wind and batteries, which already outcompetes conventional power generation and will displace fossil fuels during the 2020s ([source](#)).

Even if fossil fuels had no negative climate effect, it is a good idea to utilize the power of the sun directly instead of pumping up old plant residues from the underground. The fossil technologies are insufficient when faced with the social challenges of the future.

Today, only the 10% richest people in the World are responsible for 50% of the greenhouse gas emissions ([source](#)), but in the longer term, we can expect an explosion in demand for goods and services from a growing middle class in low and middle income countries. The overall food demand, for example, is on course to increase by more than 50 percent, and demand for animal-based foods by nearly 70 percent by 2050 ([source](#)).

The real challenge of this century is to satisfy the needs of a growing global middle class at the same time as reverting global warming.

A Divided Europe

Despite the name - the European *Union* - Europe was never united after the [Iron Curtain](#) was lifted in 1991. The dividing line just moved east - and now there is war in Europe!

Most of the former Soviet Union's European [satellite states](#) have been admitted to the EU; but Europe's largest nation - the Russians - were never invited to take part in the European integration.

It is still unclear what is behind Putin's invasion of Ukraine, but much suggests that the United States, as part of the geopolitical power game, has used NATO to weaken Europe ([Watch a lecture by Professor John J. Mearsheimer](#)).

In 2008 NATO announced that Russias two neighboring states Ukraine and Georgia would become members of NATO. That was, according to Putin, "an existential threat to Russia" and would never be allowed. Nevertheless, the U.S. ignored the warning and in 2021 reaffirmed the intention to admit Ukraine into NATO.

Putin took the bait and invaded Ukraine in February 2022, apparently with the naive intention of replacing the government with a less NATO-friendly one and annexing the [Donbas](#) region. He obviously overlooked the fact that the Americans had been training

Ukrainian soldiers for a long time and stood ready with massive arms supplies.

Despite Russia's weak economy (the size of Italy's) and outdated military, Western media were flooded with warnings about Putin's imperial ambitions. Allegedly, no European country could feel safe, and NATO persuaded them all to rearm and sanction Russia at great costs.

This war has no likely winner - only losers, and, worst of all, there is a real danger that the Americans push Putin to a point where we risk a nuclear war in Europe.

If we leave aside the American power play and saber-rattling, it seems that the real problem between Russia and Ukraine is an issue of national minorities along with many other similar problems in Europe: there are over 350 national, ethnic and religious minorities in Europe ([source](#)).

Therefore, the conflict must be resolved through an association of both Russia and Ukraine with the rest of Europe. The challenge is to unite the whole of Europe and make it a union of all European nations and minorities regardless of territorial borders.

World War vs. Global War

My generation's slogan: "Make love, not war" has clashed with the real world, and we must reluctantly admit that it has limited effect on nuclear weapons in the hands of despots like [Putin](#) and [Xi Jinping](#).

Although the current political wave of nationalism and populism may be reminiscent of the time between the two World Wars, history is unlikely to repeat itself in the form of another old-fashioned war over

territories. Data is the modern source of wealth, and access to data cannot - unlike access to fossil fuels - be conquered by military force. .

We must not, however, forget that the U.S. is threatening to intervene militarily if China attempts a reunification with Taiwan, which accounts for two-thirds of the world's production of microchips ([source](#)).

We live in a connected world - and connecting people can easily lead to ethnic conflicts. We are in the midst of a *global war* between tribes, ethnic groups, religions, and minorities. Nearly 100 tribal wars (including the one in Ukraine) are being fought around the world ([source](#)) so we need not fear the return of the World Wars, but rather the return of the [crusades](#).

Modern warfare, as we see it in Ukraine, is a hybrid combination of military, economy and technology. Wars are fought by proxy: the physical confrontation is local, but the economic sanctions, the cyber war, the supply of intelligence, the supply of weapons, and the battle for the narrative, on the other hand, are truly global: Not only governments are involved, but also corporations, sports associations and cultural institutions participate on behalf of their stakeholders and fans.

The climate change, however, with rising temperatures, wildfires, rising sea levels, mass migration and pandemics, is likely to play the role of an old school physical World War. It will probably result in the same kind of human suffering and destruction: Kill millions of people, devastate entire countries, disrupt the energy, transportation, and food sectors and destroy a lot of physical capital.

A New Global Consensus

The good part of this bleak story is that the war on climate - like previous world wars - hopefully will result in a new global consensus that can concentrate all forces on technical and social innovation in order for humanity to survive.

Although, I have promised my grandchildren that they will be OK, the road to a new consensus will be long and bumpy and our focus will constantly have to shift from one crisis to another. So, prepare yourselves for some chaotic 2020s and remember that chaos is needed for a system to change patterns.

It has been a widespread notion in the West that autocratic regimes such as China and Russia automatically would develop into freedom-loving democracies as citizens became materially richer. But that has turned out to be wrong: liberal democracy does not constitute a necessary step on the path to a higher form of civilization.

The geopolitical rivalry is taking us nowhere and there will be no winner. Instead, the great powers weaken themselves (and each other): the US is breaking down the middle, China is caught in a demographic crisis of its own making, and Europe is divided and struggling to reconcile national and ethnic interests.

It is only when we have built an alternative to the divided world in the form of a new Internet, that we can move forward. But the new Internet is not a superpower that replaces the old power structure. It is an ubiquitous mechanism that enables people to deal with their own problems, get an identity, register their property, take out loans and insurance, enter into trustworthy agreements, trade with each other, make joint decisions, etc.

Citizens of all nation states - democratic and autocratic - will eventually move to the borderless Internet to live their lives, and even autocratic regimes' attempts to cut them off will fail once everyone (and everything) get encrypted net-access via satellite.

Part 2: The Internet



In every age, power has primarily rested with whoever owned the means of production. In the agricultural age it was land, in the industrial age it was factories, and in the post-industrial age, it is data. Consequently, the key to an equitable world is sharing of data: If we can share data, we can share the societal surplus.

The Old Internet

The Internet is mankind's common nervous system. The protocols are not controlled by national governments - they are global, and community owned. The Internet can survive a war: If a node in the network is destroyed, data just runs another way.

Over the last 25 years, two layers of "[World Wide Web](#)" have emerged on top of the Internet:

- [Web1](#) - a network of static documents connected via hyperlinks.

- [Web2](#) - a network of people connected by [social graphs](#) of "likes" and "follows".

Web1 made it possible to share information almost for free and Web2 made us all creators. Anyone with a smartphone can publish text, images and sound to the whole World.

The Dark Side of Web2

Unfortunately, the Web2 centralized the Internet in the hands of an oligarchy consisting of Google, Facebook and Amazon. In exchange for access to information, we let them harvest our personal data and monetize us as products. They have built proprietary platforms and stored our data in centralized silos - vulnerable to misuse, cyber attacks and technical breakdown.

The proprietary networks have won and big tech is using our data to monopolize machine learning. Facebook collects seven million times more data about the citizens as the secret East German police [STASI](#) did ([source](#)).

There is a new [digital divide](#) underway between a [surveillance capitalism](#) in the USA and a [surveillance state](#) in China. The rivals basically do the same: they collect citizens' data to feed the machines and gain social control.

Web3

Fortunately, [Web3](#) is underway. Here, the users will be in control of their identity as well as of their data. Web3 is governed using [cryptocurrencies](#) that align network participants to work together toward a common goal. In addition to enabling users to read and write information, Web3 will be able to manage *ownership*.

Web3 will not only be on your desktop, like Web1, or on your smartphone, like Web2. Web3 will be everywhere and connect everything.

Web3 will populate the physical world with:

- Trillions of connected devices ([IoT](#)) with robotic sensors.
- [5G](#) global networks with gigabit connection speed.
- [Edge computing](#), which pushes computing power to self driving cars, robots, and drones.
- Access to a [metaverse](#) of [virtual](#) or [augmented](#) reality that will be harder and harder to distinguish from the real world.

Distributed Ledger Technology

This new Internet is based on "[Distributed Ledger Technology](#)" (DLT) which is a shared "bookkeeping" system operated by multiple "accountants" ([miners](#) or [validators](#)) in a network. The ledger can only be updated if a majority of the "accountants" agree, and if one of them tries to tamper with data, the others will immediately detect it - and punish him/her.

The technology is still under development, but it can potentially replace a lot of intermediaries: We need no banks to transfer our money, no "Facebook" to follow our friends and no "Airbnb" to rent out our spare room. By virtue of cryptography and a distributed ledger, we don't need to know (and trust) each other to make business.

The most widely used way of distributing ledgers is [Blockchain](#) - the technology behind [Bitcoin](#), whose bookkeepers ([miners](#)) use a very energy-intensive method ([proof of work](#)) to reach consensus on who should update the ledger with a new block of transactions.

Bitcoin acts as a kind of digital gold for storing value, but is not going to play any particular role in Web3. The second largest blockchain, [Ethereum](#), on the other hand, plays a central role in building Web3. It is a more modern blockchain, where the bookkeepers (*validators*) draw lots as to who updates the ledger. This so-called [proof of stake](#) mechanism uses very little power and makes Ethereum suitable as a global settlement layer for the Internet. Over the course of a few years, it is expected to be capable of inter-operating with other chains and layers and secure 100's of thousands of transactions per second.



"Blockchain is a method to make strangers work together" - Vitalik Buterin - founder of Ethereum.

Digital Agreements

Web3 can be programmed using small computer programs ([smart contracts](#)), stored on the Web.

These programs make it possible for people to enter into digital agreements, such as:

- *A lease, which automatically pays the rent every month.*
- *A train ticket, that automatically pays out a compensation if your train gets delayed or is canceled.*

- *A testament, that transfers your bitcoins to your heirs the moment it is recorded that you have passed away.*
- *A vehicle, that automatically pays congestion charges and parking fees.*
- *Shares, that automatically pay taxes on a company's earnings.*

With old-fashioned legacy agreements, a debtor can refrain from paying a bill, and the creditor's only legal way to recover his/her receivables is to go to court - and even if he/she gets upheld by the court, there may be no money to follow. In the same way, an enterprise may operate in violation of the law and, for example, not meet the requirements of solvency or liquidity. When a payment is enforced by a smart contract, the amount agreed will automatically be locked up in an decentralized escrow service or backed up by a collateral. Web3 will also be able to regulate businesses, so that a company is automatically dissolved, if it approaches insolvency.

DAOs - Decentralized Autonomous Organizations

Web3 protocols will transform human organization and will represent a paradigm shift in how we organize ourselves. The most powerful feature of Web3 is the DAO ([Decentralized Autonomous Organization](#)), which can hold everything from a small cooperative to a worldwide organization.

The key to a DAO is decentralized governance. All decisions are made collectively based on the number of governance tokens each member holds. The distribution of tokens and the voting rules depend on the individual organization. In this way, you can make business with somebody you don't know in an organization where all activity is fully transparent to the members.

Companies are investor-owned - DAOs are community-owned. They are a revolution of efficiency and will likely replace both companies and governments in this century. Shareholders, working for individual profit, become stakeholders, working for a common cause.

In its pure form, a DAO consists of software which define the rules of the organization. A DAO has no jurisdiction, can not be regulated, has no headquarter, and no employees. It lives solely on the Internet and can not be shut down.

DAO examples:

- *A charity DAO, where a group of donors decide how they want to spend donations.*
- *An owner's DAO, for a residential property where the shared economy is administered and decisions are made regarding common matters.*
- *A freelancer's DAO, where contractors pool their funds for office spaces, software subscriptions, etc.*
- *An investment DAO, where members pool capital and vote on ventures to back.*
- *A village DAO, where residents share energy, water, communication, transportation, etc.*
- *An UberDAO, which pairs drivers with riders and saves them from paying a fee to an intermediary.*
- *An Insurance DAO, where a group of members share risks without a third party profiting from it.*
- *A governance DAO, for cryptocurrencies like [Bitcoin](#) or [MakerDAO](#).*

Part 3: The Post-Industrial Era



As previously stated, mankind's primary challenge is getting climate change under control and, at the same time, meet the demand from billions of people in middle and low income groups who want the same type of life as the global elite.

The *industrial capitalism*, which created the problem in the first place, can't solve it. The old-fashioned capitalist strategy for solving social problems would be to make everyone so rich that they could buy all they needed. But such an approach would most certainly aggravate the climate problem to a tipping point of no return.

Fortunately, we are putting industrialism behind us and are moving into a *post-industrial era* where we will be able to combine growth and sustainability and make goods and services so abundant, that everybody can afford them.

The differences between the *industrial* and the *post-industrial* era, which will be developed further below, can be summarized as follows:

The industrial era	The post-industrial era
Mass production	Custom production
Scarcity	Abundance
Hierarchies	Networks
Shareholders	Stakeholders
Centralization	Decentralization
Goods	Services
Animal protein	Synthetic protein
Factory work	Distributed manufacturing
Secret recipes	Open source
Wage labour	Self-employment
Competition	Collaboration
Bank money	Digital cash
Inflationary	Deflationary
Greed	Trust

The post-industrial economy (or whatever it will be called in the future) is also capitalism, in the sense that it is based on market economy and private property - even if ownership is spread to more people.

However, declining transaction costs will put the corporate organizational model under pressure and enable individuals to create and share value without a firm (see Part 6: "[From Shareholders to Stakeholders](#)").

How Can Stuff Be Redundant?

We have a resource problem on our planet - not because the globe contains only a finite amount of resources - but because our economic system is unable to consume natural resources in a sustainable manner. If all resources were priced correctly, climate change would not exist.

If you have a hard time understanding how real stuff can become abundant, you are right in the way that [Lamborghini](#) sports-cars are not likely to become abundant; but capitalism can be transformed so that all basic needs can be fulfilled for everybody (see more [later](#)).

We can expect our planet to become [dematerialized](#) in such a way that we will be able to transform what we already have, instead of buying new stuff. A new era will introduce greater resource efficiency and new technologies able to substitute scarce resources with abundant new ones. The most critical resource - fossil fuels - can be replaced by water and solar power - and we have a lot of that.

The post-industrial economy is characterized by “technological deflation”. Technology is developing so fast that it is profitable to invest in additional production even though prices are plummeting.

This phenomenon confuses mainstream economists. A smartphone that costs \$1.000, replaces over 25 hardware products like: phone, Wi-Fi router, watch, camera, TV, video, radio, CD and DVD player, tape recorder, scanner, GPS, alarm clock, compass, flashlight, spirit level, etc. valuing about 10 times more. But because labor productivity is calculated as value added per working hour, economists see a decline in labor productivity: the value has not risen - on the contrary - it has fallen by \$9,000. The smartphone workers produces more phones - but less economic value.

The economic textbooks state that the price of goods and services will approach the [marginal costs](#), which is the price of producing an additional unit of a product after the fixed costs have been paid. No one had imagined that the marginal cost of goods and services could approach zero- but apparently that's what is happening ([source](#)).

The Future is Not Only Digital

In the "[Roaring Twenties](#)" of the last century, oil, electricity and the internal combustion engine had reached a point where productivity exploded in a boom that lasted until the digital technologies arrived in the 1970s.

But the digital technologies did not lead to a similar productivity boost in the "[real economy](#)". As impressive as personal computers, smartphones and social media are, you can not eat them, drive them, live in them, or wear them.

But now we are looking into a new explosion in real world productivity. This time it will be based on a convergence of [quantum computing](#) and [microbiology](#) , enabling us to program genes and develop new materials and products that we can eat, drive, live in, and wear.

Technological development in modern times has gone through three phases: material transformation (machines), information processing (computers) and now biological transformation (microbiology).

Quantum Computing

A major technological step to be taken during the next decade will be the introduction of [quantum computing](#), that, for certain tasks, is expected to be millions of times faster than today's supercomputers.

Quantum computers will be able to handle all single atoms in the known universe, enabling the creation of accurate molecular scale models of everything from personalized medicine to “green” fertilizers. Imagine when we develop self replicating robots that build and repair themselves using carbon dioxide from the air.

A big leap forward occurs when quantum computers become capable of simulating [nuclear fusion](#) in real time and thereby enable stable fusion reactions. This could enable the development of compact fusion reactors the size of a shipping container.

Microbiology

Microorganisms hold the key to solving many of the challenges we face on the planet: climate, clean water, food, disease control, biodiversity etc.

The pandemic brought us a type of vaccine ([mRNA](#)) that promises to provide extremely effective protection against numerous other diseases like flu, malaria, HIV, cancer, etc. Instead of discovering new drugs, we can now design them.

Microbiology has become information science and, as soon as something becomes information, development becomes exponential. Living organisms are defined by their [DNA](#), which can be edited similar to software. Up to 60% of the global economy's physical inputs could one day be produced biologically ([source](#)) and fuel could be produced from atmospheric carbon dioxide.

For the first time in human history, we are now able to re-engineer life. Genome editing technologies like [CRISPR](#) offers to edit genetic material just like a spell checker. Using synthetic biology, we can

program microorganisms to do what we want them to do and use bacteria as factories to make all the substances we want to produce.

Food Production

Proteins are the most important molecules in our food. They are the building blocks of life, but we produce them in an extremely inefficient way using macro-organisms like animals as hosts for the micro-organisms that process the nutrients. Especially the cow is a bad example of a macro-organism which wastes a lot of nutrients and furthermore emits large amounts of greenhouse gases into the atmosphere.

Now, biotechnologies allow us to unplug micro-organisms entirely from macro-organisms and manipulate them directly in a much better and more cost effective manner using [precision fermentation](#) - a process that enables micro-organisms to produce almost any complex organic molecule.

[Vertical farms](#) - based on soil free, indoor growing techniques - can grow 30 times more food per hectare - using 90 % less water than traditional farms.

The organization [RethinkX](#) has projected these technologies to 2035, where they anticipate:

- that the demand for cow products will have shrunk by 80%,
- that about 60% of the land currently being used for animal agriculture will be passively reforested or rewilded whether we want it or not,
- that the cost of proteins will be 10 times cheaper than existing animal proteins, and

- that farmland values will collapse by 40% - 80%.

Even if these projections should be too optimistic, there is reason to believe that we will be able to feed a growing population with tasty and healthy food that everyone can afford.

From Goods to Services

We are going to save a lot of atoms when people learn to share cars, washing machines, 3D printers, etc.

The pandemic brought us remote work on a large scale and it is here to stay. It also brought us speedy delivery bicycles that are taking over the city streets, transporting meals and groceries.

Car manufacturers are preparing to disrupt the automobile market by selling [mobility as a service](#) instead of cars, which makes perfect sense as the transport market is much bigger than the car market ([source](#)). A shared, self-driving electric vehicles can drive a kilometer at a cost many times lower than the cost of a private car parked 95% of the time.

A washing machine and a tumble dryer are used at most once a day and occupy about a square meter, which costs at least \$10,000 in London, New York or Copenhagen. It is a lot cheaper to dump the dirty clothes in a self-driving laundry basket, sent by the local laundry shop. Thus, the market for washing machines can (again) become a market for laundry services.

Custom Production

With 3D print ([additive manufacturing](#)), physical objects can be manufactured close to where they are consumed. Any physical shape

can be recreated from materials like metals, plastics, ceramics, glass, rubber, leather, and stem cells.

When atoms are digitized, the “print file” is worth the money, not the physical item.

The Danish family company "[Thürmer Tools](#)", which makes thread cutting tools, is reinventing itself as a digital company focusing on 3D printing. The digitization is so complete that they do not even expect to print their own tools in the future. Instead, they will sell digital tool designs in the form of print models that customers download to a shared printer of their own choice. If customers improve a design, they get a cut of future license payments.

Transportation

The railroad is an 200 years old mode of transportation that is inflexible and hard to modernize. Therefore, transport has for a long time been moving from iron wheels to rubber wheels, from goods wagons to trucks, from trains to buses. The next step will be to reserve dedicated lanes on the highways (or new corridors on former railroad tracks) for driverless trucks and buses.

Private cars (fossil-powered or not) take up the free space in the cities, waste our time in congestion, kill us in traffic, pollute the air, and prevent our kids from playing outside.

It is therefore time to replace private cars with autonomous minibuses, robo-taxis, bicycles, electric scooters, etc.

Walking and cycling saves both CO2 and health costs: Moving a commuter from a car to an e-bike saves society around USD 1 per kilometer ([source](#)).

The way to finance the new infrastructure is [road pricing](#). Cars must pay for the costs they inflict on society, while bicycles should be subject to a “reverse road pricing” so that cyclists are paid for every kilometer, they ride.



On a global scale, minibuses have long outperformed all other forms of public urban transport. Now we have to make the minibuses self-driving and teach them to drive in convoy on roads specially designed for them. This is made possible by 5G communication that enable vehicles to talk to each other, to monitoring centers, and to the infrastructure.

The Build-up Environment

Currently, the world's [mega-cities](#) are exploding, especially in Asia, and we will likely see metropolitan regions develop into modern versions of the historic [city-states](#) like Florence and Venice. They will spread out and conquer the rural hinterland and possibly replace some nation-states.

However, urban growth is likely to slow down, as the Internet offers some of the same benefits as cities - at a much lower price. There is no

need to move to the city to find work if you can work online. Many brick-and-mortar institutions will become obsolete and algorithms will replace a good part of government offices.

The city shops and offices will be converted into housing, and the suburbs will become more and more urbanized with new small businesses, 3D print shops, coffee shops, etc. Even the small towns can look forward to new life.

The homes, offices and workshops of the future are likely to be smaller and partially transportable, so that some units in a home can be placed on an autonomous platform and taken to work or on a weekend trip.

The construction and operation of our buildings, bridges and roads account for almost 40 percent of carbon emissions ([source](#)). Most building-related emissions come from energy use in the buildings (lighting, heating and cooling), which is why electrification plays the main in decarbonization.

In construction, cement is the big culprit, as it not only consumes a lot of energy in the manufacturing process; the chemical process itself emits carbon dioxide. Since eight percent of the world's emissions come from cement alone ([source](#)), we can expect a growing use of biological building materials such as wood and waste products from agriculture.

The role of rural areas has historically been production of food for the cities. This will continue to be the case, but as vertical farming and synthetic manufacturing makes food production much less land and water intensive, food can be produced on a smaller scale and with local raw materials much closer to the consumers.

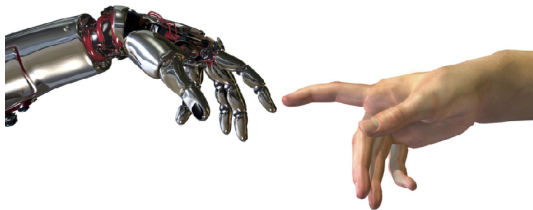
Onshoring of Production

The driving force in the last 50 years of globalization and offshoring of production has been cheap labor, especially in China.

Now, growing costs, automation, 3D printing, biotechnology and new materials is making it profitable to onshore production and move it closer to the markets. In the future, we will not buy a new shirt, but buy a digital model of a shirt and print it in a shop around the corner.

We are moving to an era, where data is exchanged instead of atoms and where we will be globalizing and decentralizing at the same time.

Part 4: Man or Machine



Machines can make our lives more comfortable. And don't worry, they are not taking our jobs away. There is plenty of work to do; but we humans must retain control and not leave it to the machines.

Machine Learning

As the world is being reduced to data, we need machines to make sense out of them. The amount of data is doubling every year; but data is used too little - either because we can not cope with the large amount, or because it is monopolized by corporations like Facebook and Google.

Computers have not changed much in 50 years. They are smaller and faster, but they are still boxes with processors that run instructions from humans. So-called "narrow" [Artificial Intelligence](#) (AI), like [Machine Learning](#), is changing that: Computers are now able to program themselves to solve a specific task by finding pattern in the growing pile of data. The core of computing is changing from number-crunching to decision-making.

Artificial intelligence

As a next step, we are facing a breakthrough for [General Artificial Intelligence](#), which will provide computers with the ability to automate any human-level activity and build robot capable of broad integration into human life.

Artificial intelligence should not be confused with human intelligence; but should rather be seen as a much needed complement to human intelligence. Instead of fearing that machines take control over humans, we could use AI to control the machines and to improve the way we "talk" to them.

Later on we come to the final stage of AI development, which is the emergence of [super-intelligence](#) that could unlock the secrets of the universe and compensate for our own "stone age brain".

The human brain was fully developed around 50.000 years ago and has not grown since (because the skull is too small). We are therefore navigating the complex modern world with the brain of a hunter-gatherer - which of course result in a number of problems.

One problem manifests itself in our limited ability to socialize. We are only capable of cooperating with approximately 150 people ([Dunbar's number](#)) who we know personally and trust. Our brains are hardwired with mistrust of strangers.

One of the first things, super-intelligence will likely do, is help us fix the damage we have done to the planet and ensure the most efficient form of global governance.

Brain-Computer Interface

A few years ago, driving a car was used as an example of something that computers could never learn to do. It has proved to be wrong

(although there is room for improvement). But now the same is said about the ultimate computer interface: the direct connection between the human brain and a computer: the Brain-Computer Interface ([BCI](#)).

BCI has the potential to open up the planet's diversity and make us wiser, happier and more accessible. We will no longer have to worry about all the things, we don't understand. New problems may, however, arise when people stop believing in the narratives that bind communities together: God, money, Santa, etc.

AI is not going to replace us, but the human brain and AI will eventually merge and provides us with a massive boost in processing power and memory. Imagine the power of a World Wide Web of all connected brains thinking together. The good question is, how smart do we want to be?

Labour

Under industrialism, everything was about efficiency. In the post-industrial era, only the machines need to be efficient. Our children and grandchildren don't need boring routine jobs to satisfy their basic needs. They can concentrate on social needs and on being playful and creative.

In the 19th century, the prevailing theory among economists like [Ricardo](#) and [Marx](#) was that goods and services were exchanged according to the amount of labour that was put into them.

In the 20th century, this [labour theory of value](#) was replaced by the idea that value derives from entrepreneurs and investors. Instead of slaving in the factory, many workers now sat at desks and made product design and marketing.

In the 21st century, machines will both produce and sell the goods. We will be relieved of the boring work both in the factory and at the desk, and the machines will be able to meet our basic needs.

An anecdote: A trade unionist visits a car factory and sees a vehicle being assembled by robots. The proud manufacturer asks him teasingly, how he expects the robots to pay union fees in the future. "I am afraid it will be just as difficult as getting them to buy cars," he replies (source: unknown).

Basic Needs

Machines will certainly take over a lot of the existing tasks - but that is only a problem if workers lose their livelihood and there is no fair way to distribute the societal surplus and incentivize people to develop their social skills and help each other.

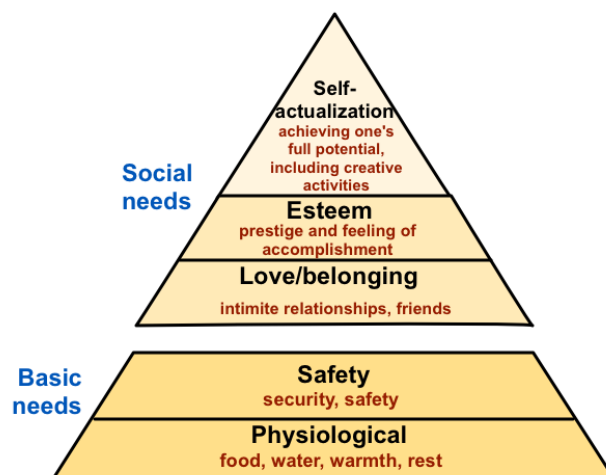
Industrialism created paid employment and absorbed the labor liberated from agriculture. With the help of wage labor, factory workers could meet their basic needs of food, clothing, roof, and security.

Coverage of these basic needs was defined in 1948 by the UN as a [human right](#) and the coverage of basic needs is still a very powerful driving force moving millions of people from subsistence economy to "urban" jobs every month; but we are finally approaching a stage where basic needs can be saturated for a big part of the world's population and where humanity can start concentrating on achieving higher goals beyond mere survival.

Maslow's Pyramid

The American psychologist [Abraham Maslow](#) has organized human needs in a [hierarchy of needs](#) with basic needs in the bottom and social needs in the top.

In contrast to the basic needs, social needs are culturally conditioned and cannot be saturated. They cannot be met by machines, and their fulfillment will keep people busy regardless of technology. Machines are not social and they don't form communities, so in order to meet the needs of the upper part of the Maslow pyramid we depend less on technological tools and more on human qualities such as morality, empathy, shame and creativity.



The lower part of Maslow's pyramid consists of the basic needs and the upper part includes social and psychological needs like love, friendship and esteem that qualify us as humans. At the very top he placed our need to be creative and to achieve our full potential.

Education as the New Job

The vast majority of work is invisible on the labor market: The reproductive work is completely overlooked as part of our common livelihood and more than 60% of the world's population make their living in the [informal sector](#).

A growing part of the industrial workforce is becoming self-employed freelancers ([source](#)) who work multiple part-time jobs or start their own small businesses. [Bounties networks](#) open up the global freelance market and include people from low-income countries who were previously excluded due to banking requirements and lack of formal education.

However, self-employment, [precarization](#), [gig economy](#) or [entrepreneurship](#) makes greater demands on education, than permanent jobs. In the post-industrial era, we therefore need a culture of adult education to avoid losing citizens to passivity, ignorance, xenophobia and obesity.

During the pandemic, the US in particular experienced the so-called "[Great Resignation](#)", where employees resigned from their jobs en masse as a reaction to low wages, poor working conditions and incompetent managers.

Human skills should be complementary to what machines can do, so we can stop teaching our kids to do what machines do better. They do not need to learn to get up in the morning, to memorize, to copy, to obey orders, and to get in line. Instead of cooperating to produce, they must cooperate to learn.

The great challenge for humanity is to get the best out of our own species. Therefore, we should pay people to participate in learning

activities. Everyone must have the opportunity to achieve their full potential and receive an education that corresponds to their abilities. In the future, learning most likely will be seen as the new job.

Part 5: Token Economics



Historically, commodities like gold or silver have acted as medium of exchange of value ([currency](#)) because they are expensive to extract. However, they turned out to be impractical because they lose value by wear and tear. Instead, emperors and kings stored the gold and silver in treasuries and issued *tokens* (tin coins and paper notes) to represent the precious metal. The tokens could always be redeemed for real gold or silver. After the Second World War, a system was established in [Bretton Woods](#) that ensured convertibility between the Western currencies and the US gold reserves.

Fiat Money

In 1971, however, US President Nixon abolished the Breton Woods agreement and the dollar became "[fiat money](#)" - i.e. money without intrinsic value. As a consequence, the money supply went out of control.

There are two main types of fiat money:

1. [Sovereign Money](#) (or central bank money) consisting partly of coins and banknotes issued by the central bank and partly of [central bank reserves](#) which is “wholesale money” used for payments between banks. A third, and new, type is a [Central Bank Digital Currency \(CBDC\)](#), which is an electronic version of the fiat currency issued by a central bank either in a retail version or in a wholesale version.
2. [Bank money](#) in the form of an [IOU](#) from the commercial banks to their customers. When a customer takes out a loan, the bank deposits the money on the customer's account and give him/her an IOU, i.e. the right to spend the money.

It is a myth, that banks lend you money that savers deposit. More than 90% of the money in the world is bank money created by the banks themselves ([source](#)). By virtue of this so-called [fractional reserve banking](#), the commercial bank deposits are backed up by a very small fraction (2,5% or less) of central bank money. Banks lend money they do not have ([source](#)).

Digital Tokens

With Web3 and distributed ledger technology, we get *digital tokens*. They can represent all kinds of [assets](#) or [access-rights](#) and have the following advantages:

- They do not wear out like metal and paper tokens,
- they are hard to counterfeit,
- they can be exchanged as easily as text messages,
- they can be programmed to behave in certain ways,
- they facilitate fractional ownership, and
- they make illiquid assets liquid.

We are returning to the barter economy. With the help of digital tokens, anything can be exchanged for anything.

"Tokens might affect the financial world in the same way as email affected the postal system" - [Shermin Voshmgir](#) in the book "[Token Economy](#)".

Fungibility

Tokens can be either *fungible* or *non-fungible*:

[Fungible tokens](#) are identical and interchangeable and can be used as means of payment. Examples are:

- Digital cash in the form of government CBDCs or privately issued [stablecoins](#).
- [Cryptocurrencies](#) that have value because their supply is limited and people have faith in the cryptographic system that supports them.
- [Utility tokens](#) that provide access to an application or a service.
- [Security tokens](#) that replace the paper version of stocks, shares, bonds, etc.

[Non-fungible tokens](#) (NFTs) are unique by nature and are not directly interchangeable. They can represent everything that can be owned and are already used to represent digital collectibles and limited editions of digital artwork.

They can also represent real estate, vehicles, gemstones, voting rights, door keys, passes, train tickets, copyright, software licenses, certificates, etc.

For artists, one of the very interesting benefits of NFTs is that the certificate can be programmed to pay the artist a share of all secondary sales of a work. If the same functionality was generalized

to cars and other products with built-in obsolescence, it could incentivize manufacturers to increase product durability.

Digital Cash

Digital cash tokens offer many additional advantages over physical tokens:

- They are stored in digital wallets (on a smartphone or the like) and not in banks.
- They can be issued by both central banks (CBDCs) and private actors (stablecoins).
- They make money transfers instantaneous.
- They support micro-payments: a car automatically pays the road for every kilometer it runs, an artist gets paid when we listen to her music and an electric bulb pays for its power consumption every hour.
- They open up new tax opportunities like collecting a small fee on every payment.
- They can replace fractional reserve banking with a financial system similar to [full-reserve banking](#).
- The control over [money supply](#) become more powerful.
- They can coexist with old fashioned physical tokens (coins and notes).

After the COVID-19 lockdowns, many governments tried to restart society and stimulate consumption by giving cash directly to citizens as so-called [helicopter money](#). But unfortunately, there is no guarantee that people don't put the money in the bank instead of spending it. Digital cash offers a much more accurate method of stimulating specific forms of consumer behavior since they can be

programmed to be spend only on specific goods and within a certain time limit ([source](#))..

Stablecoins

A *stablecoins* is a privately issued digital cash token [pegged](#), or tied, to a fiat currency like the USD or the Euro. It should be collateralized by underlying assets like commodities, government bonds, wholesale CDBC-tokens, cryptocurrencies or security tokens (bonds or fractions of real estate). However, since the area is unregulated, many stablecoins have failed due to insufficient collateralization ([source](#)).

However, with proper regulation and a requirement for 100% collateral in the form of wholesale CBDCs, national banks could leave the issuance of retail digital cash to private players. In doing so, the central banks could, once again, gain some control over the money supply.

Banking the Bankless

Poor people in developing countries are often bankless either because they do not have a personal ID, because the bank is too far away, or because it is too expensive to open and maintain an account.

Furthermore they often have no credit rating or do not have legal rights to the house, they live in, or to the land, they farm. Without access to banking services they can not save up, start a business, transfer money to remote family members or shop online.

But a solution is underway in the form of decentralized financial services on Web3 ([DeFi](#)). The system offers all of the same products as the traditional finance world such as lending and credit arrangements, but without the need for a middleman or a bank. Anyone can loan

their digital cash to borrowers worldwide in return for digital asset collateral.

A Global Reserve Currency

The USD has served as a global [reserve currency](#) since World War II - even though the gold redemption was abolished in 1971. The Americans therefore pay their foreign bills with money they print themselves. Dollar bills are the largest American export item.

The dollar's role as a global reserve currency is the American economy's Achilles heel and American politicians are, therefore, fighting hard against anything that looks like an global crypto coin, such as the failed [Libra](#) currency.

On the geopolitical scene, the [BRICS](#) countries, with China and Russia at the forefront, are working to establish a digital reserve currency, which potentially will be backed by the huge Chinese and Russian gold reserves ([source](#)). The [People's Bank of China](#) has already issued a digital yuan.

It might very well be time for the world community to come together to create a shared digital reserve currency as suggested by the Bank of England ([source](#)).

Thousands of Coins

We are heading to a world where the money of the people, the money of the state and the money of corporations will be competing. Every town (like [Bristol](#)) and every retail chain (like [Walmart](#)) will create their own coin and it is easy to imagine a revival of the national currencies in Europe.

Large global companies such as Apple and Amazon can benefit a lot from introducing their own utility coins that could function as internal means of payment in the supply chains. Furthermore, such coins could integrate customers and other stakeholders further into the networks. In doing so, these platforms can bypass national governments and save transaction costs and taxes.

Tokenized Fundraising

In the future, real estate developers could pay their suppliers (architects, engineers, and contractors) with tokens representing fractions of the finished building. Once the construction is completed - or maybe earlier - the participants can sell their tokens either to new homeowners or on the open market. Everyone is a partner and a stakeholder, and everyone is motivated to get the best out of the project.

The traditional way for startups to raise funds from investors is to sell shares publicly through an [IPO](#) (Initial Public Offering). In a token economy, they can raise funds via a token sale in the form of:

- either a [STO](#) (Security Token Offering), where rights to future profit are sold in a tokenized version of an IPO,
- or an [ICO](#) (Initial Coin Offering) where utility tokens are sold as rights to future benefits, like when an airline sells frequent flyer miles to finance the purchase of new aircrafts. Utility tokens can be exchanged, but they give no ownership to any part of the issuing company.

The [Ethereum Network](#) was funded in 2014 through an ICO, in which a number of Ether-coins (ETHs) were distributed to stakeholders. Ether is a utility token that is used to pay for services

on the Ethereum network and were sold to potential users and given as a reward to core developers.

This funding method came to form a school for a lot of startups, who issued their own coins to crowdfund business ideas.

Part 6: From Shareholders to Stakeholders



The capitalist form of production suffers from three fundamental flaws:

1. The social and environmental costs of production are not included in the price of the products.
2. The system promotes [artificial scarcity](#), and monopolized platforms - like Google, Facebook, Amazon, Airbnb and Netflix - stand in the way of free markets.
3. The system overcomes the lack of trust between humans via intermediaries like banks, public services, escrow agents, etc., who take a substantial cut of the produced value.

The capitalist system is based on private property rights and is programmed to exploit greed as the driving force. From a societal point of view, this is not an optimal solution, and fortunately, we will soon be able to redistribute control from the few to the many - from

shareholders to stakeholders - and to program our organizations to perform far more efficiently.

"The productive forces at the disposal of society no longer tend to further the development of the conditions of bourgeois property; on the contrary, they have become too powerful for these conditions, by which they are fettered, and so soon as they overcome these fetters, they bring disorder into the whole of bourgeois society, endanger the existence of bourgeois property."

[The Communist Manifesto](#)

Collaborative Capitalism

Distributed ledgers are gradually turning the old school shareholder companies into networks that allow competitors to collaborate without giving up control and without revealing trade secrets.



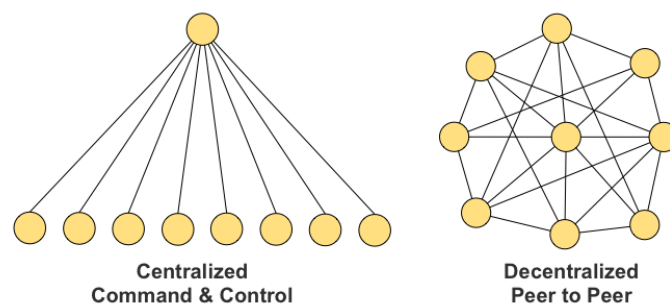
An example of this new collaborative trend is the logistics platform [TradeLens](#) developed by [IBM](#) and [Maersk](#). It is a shared distributed ledger where the world's major shipping companies connect their it-systems to cut through red tape and save costs. The next step in international transport is likely to be autonomous containers that can be rented just like a [robo-taxi](#) and can find their way by themselves, on water, on wheels and in the air.

In this way, competition will force more and more corporations to connect their proprietary systems in distributed [intranets](#). They take

distributed ledger technology mainstream and, gradually, their services will re-emerge in autonomous organizations on the Internet.

From Silicon Valley to the Internet

Tech giants like Google, Facebook and Amazon are children of Web1 and Web2 and have evolved into the World's largest companies in a matter of years. Similarly, Web3 will create new businesses that outperform some of the old ones.



Centralized organizations and hierarchies can be outperformed by polycentric networks where a person's power is more based on how many networks she is a part of and less on how many people are under her control.

The new network companies, however, will probably be smaller and not necessarily of American origin. Smaller businesses are expected to collaborate and share digital resources with everyone, including smart people from poor countries.

Software development will likely move from Silicon Valley to the Internet and everybody will gain access to a global market. Even small businesses are becoming multinationals with partners and employees worldwide.

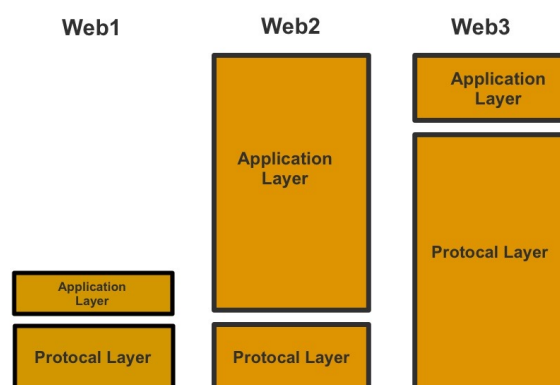
Protocols vs Applications

The Internet consists of 2 layers:

- A bottom layer made up of [infrastructure protocols](#).
- A top layer of [applications](#) that do something useful for the users.

The original Internet consisted mainly of a protocol layer and very little money was made on the Internet during the Web1 era.

With Web2, a "fat" application layer was created by companies such as Google and Facebook who earn a lot of money on these applications ([source](#)).



From a societal point of view, Web2 is not an optimal model. A lot of resources are wasted because all companies build the exact same type of proprietary applications to run their business. [Uber](#) not only build a website, they also have to build a mobile application, an identity system, a payment system, a storage system and more. When [Lyft](#) came along to compete with them, they have to build their own versions of the exact same components.

Web3 builds on a "fat" infrastructure layer of [open source](#) protocols and only needs a thin layer of applications. Everyone can share the

protocols and a myriad of companies will collaborate on top of this infrastructure.

[Linux open-source](#) collaboration demonstrates, that it can be advantageous for companies to collaborate rather than to compete. Instead of developing their own features in an operating system, Linux users share the code and help each other with bug fixes and improvements.

The Network Effects

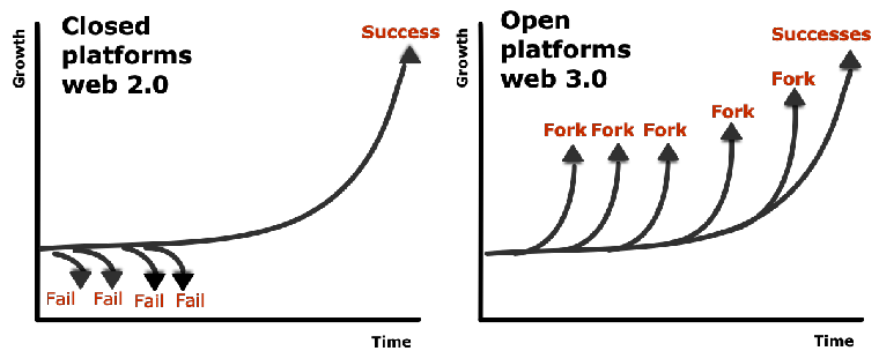
The industrial economy was dominated by the law of "[diminishing return](#)" according to which, the marginal output of a production process decreases, the more of a single factor of production is put in. The textbook example is about digging a hole in the ground: if one person can dig a hole in five hours, it will take more than one hour for five people to dig a similar hole.

Network economy is dominated by a completely different logic: [Metcalf's Law](#), which states that the value of a network grows exponentially with the number of nodes. The classic example is the telephone: the more people have a telephone, the more useful it becomes to everybody.

Metcalf's Law gives rise to the so-called "[bootstrap problem](#)": It is hard for a network project to get through the initial phase - where the costs are high and the application utility is low - until the network reaches a critical mass of users.

This explains why the Web2 is a "[winner takes all](#)" game. After reaching a critical mass, the winning players establish a monopoly by acquiring competitors and by staying technologically renewed through acquisition of startup companies. In recent years, we have seen the so

called “sharing economy” like Uber and Airbnb follow this prescription.



As a result of the “bootstrap problem”, most attempts at new networks on Web2 fail and the investors loose their money.

On Web3, on the other hand, entrepreneurs don't lose their initial investment. If they are dissatisfied with the network, they can continue on a free copy - they can [fork](#) instead of fail.

Stakeholder Economy

The capitalist model of ownership is facing a radical change, but there is bad news for those who hope that markets will break down under post-industrial economy. The Web3 economy holds market forces on steroids. Everything can be traded: If you, for example, order the fast trip in a robo-taxi, it will pay the transverse traffic to hold back, and instead of buying Internet access via an intermediary service provider, tomorrow's electronic devices will work in a mesh-network and buy capacity from each other.

The old-fashioned monopolists do not have much to look forward to either. The Web3 economy is not suited for centralization: heierarchies are expensive to maintain and it is hard to keep secret recipes on an

open network where everybody can copy them. Furthermore, 3D printing eliminates economies of scale by lowering the threshold for mass production, and monopolies do not work well without economies of scale.

The factory work from the industrial era was based on a division between capital owners and wage workers. The owners get a return on their investment and the workers get paid for their work. During the post-industrial era, a lot of businesses will be sharing open source protocols and owners and customers will be replaced by a far larger, and more deeply, incentivized group of stakeholders

"The tools of innovation are becoming democratized and starting a new business is less and less capital intensive. The price of bringing a tech product to market in the 1990s was 2,5 million USD. In the 2000s it dropped to 250.000 USD and now it starts to look like 250 USD" - [Boyd Cohen](#), urban strategist.

It will be very hard for the incumbents to preserve their monopoly benefits. The number of small corporations will explode and [self sovereign workers](#), who fully control their own time, will replace wage workers.

Distributed Organizations

Over the last couple of hundred years, production has undergone tremendous technological development, while management has changed very little. Now Web3 is introducing a collaborative governance model that potentially can release huge social resources. The decentralized organizational model (DAO) can be used, not only by companies, but by all kinds of institutions and communities.

Web1 and Web2 made stores drop their brick and mortar shops and move out on the Internet. With Web3, the turn has come to offices and administrative functions that all move on the Web.

Large corporations will likely organize themselves as distributed organizations and apply market forces to their internal workings by introducing their own coins and turning the organizations into networks of autonomous teams that do "business" with each other.

Already today, many big corporations do not invent or manufacture much themselves. Instead, they label brands on products, they acquire. In the future, consumers will co-own their favorite brands and can choose to invest a dollar every time they hit the "like" button on social media.

Brands become decentralized. We will own a part of everything we enjoy and we will help selling it. What a friend says has more sway than commercials conceived by an advertising agency.

Transaction Costs

Instead of consumers interacting with companies, they can interact directly with each other acting as producers. This is already happening for house-owners on [Airbnb](#), car-owners on [Uber](#) and influencers on social networks.

When hierarchies become networks - and networks become markets - why not manufacture goods and services in an open market of sovereign and autonomous workers rather than within companies? Web3 will blur the lines between the market and the firm since it diminishes the costs of economic transactions.

Digital technologies have in recent times lowered the so-called [transaction costs](#). Outsourcing, offshoring, freelancing, digital payments, etc., is moving a lot of work from corporate hierarchies to the [gig economy](#). Web3 has the potential to bring down the cost of transactions by a factor 100 or more, just as the Web1 and Web2 has brought down the cost of information.

The “many-to-many” business will out-market the “one-to-many” business.

Part 7: From Government to Governance



The global governance system of the future is not a traditional political system based on compromises and majority rule; but a multi-stakeholder system governing a diversified infrastructure for the Internet. In the same way as tomorrow's computer technology mimic nature's way of processing, in the same way will Internet governance mimic nature's diversity and it's way of selecting the best solutions. And, if a minority is not happy with a solution, they just make copy of the code and modify it to suit their own needs

Weaknesses of Nation States

Although national borders were given new life during the COVID pandemic, neither the Internet nor the viruses respect them.

In addition to their obvious lack of global preparedness, nation states suffer from a number of weaknesses:

- Instead of cooperating, they compete for scarce resources.
- Their economic base is crumbling as a result of falling income taxes and rising tax evasion.
- They build on a principle of [sovereignty](#), which means that the international community can do very little if a state brakes the rules.
- The migration between nation states give rise to a growing number of minority issues.

Corporate Activism

Traditionally, corporations have not interfered in politics beyond pushing to keep costs and taxes down, but as power moves from shareholder to stakeholders, companies like Apple, Nike and Coca-Cola are beginning to take political positions and CEOs like [Elon Musk](#) use their companies as platforms to push political and social agendas. The lines between "private" and "public" are blurring - governments are behaving like market actors, and corporations are behaving like governments.

Similarly, in the context of global warming, corporations often prove to be far more far-sighted and consistent than elected governments, who fear that climate costs will scare away certain groups of voters.

Virtual Nations

Just as companies of the future will be able to operate without a physical headquarter, nations will be virtualized and able to exist without a territory. We no longer need to live in a particular place to be part of a nation, a culture or a tribe.

Cultures flourish on the Internet and even if you move to another part of the world you can keep your identity, worship your religion, support your favorite football team, receive education in your own language, settle disputes on virtual platforms, etc.

I have friends in Mozambique who are ardent supporters of the Portuguese football club [Benfica](#) without ever having set foot in neither Portugal nor on Benfica's stadium in Lisbon. They enroll their newborns in the club, they wear the club scarf and jersey, and they never miss a match.

The challenge is that nations and tribes must learn to share the same geographical territory - like in Ukraine, where the 33 million Ukrainians used to share territory with 7 million Russians.

Multicultural Cities

Innovation happens in cities, not in countries. Cities are multicultural - not constrained by nationalism - and are more comparable to corporations than to nation-states. If national governments did not get in their way, cities could solve many of today's cultural and environmental problems (watch the TED talk "[Why Mayer's should rule the world](#)").

In larger cities, the political majority is usually greener and more globally oriented than the rural population, which is typically more developmentally skeptical.

Class Politics vs. Identity Politics

There is a convergence of income, birth rates and life expectancy between the Global North and the Global South, but culturally we are

far from globalized. On the contrary, the world is becoming more and more diversified.

In liberal democracies, each social class used to be represented by a political party which looked after their interests and negotiated the distribution of wealth. Nowadays, most voters find that politicians simply represent their own interests and keep wealth to themselves. As a result, democracy is turning into [populism](#).

Politicians go for quick fixes and for the lowest common denominator, and manage to get elected only because the voters have no social point of reference.

Class politics have been replaced by [identity politics](#), which is a modern form for [tribalism](#) based on racial, religious, ethnic, sexual, social, or cultural values. These issues cannot be resolved through elections and majority decisions, but require tolerance, coexistence and consensus decisions.

Rebooting Democracy

Climate change will require us to change the very subject of democracy. The subject is no longer today's population, but all of future humanity. We must reboot democracy and learn to think globally and long-term. Fortunately, Web3 introduces alternatives to "one person - one vote" or "one dollar - one vote" systems:

- [Liquid democracy](#) is a combination of a direct and a representative system where you delegate your vote to other voters, whom you trusts to have good knowledge of the issue in question. A voter can appoint an unlimited number of delegates in different domains, and the delegation can be withdrawn at any time. Delegates may pass their votes to third party voters.

- [Quadratic voting](#) (or proportional voting) is another class of tokenized governance technologies used to make balanced collective decisions instead of majority voting, which tends to underrepresent minorities. For example, to select one out of several candidates, each voter could be given 100 tokens that they can spend in the following way: it costs 1 token to give a candidate 1 vote, 4 tokens to give the same candidate 2 votes, 9 tokens to give 3 votes and so on. If a voter wants to spend all 100 tokens on just one candidate, 100 tokens “buy” 10 votes. Negative votes are also allowed, so if a voter really dislike a candidate, he/she can give minus 10 votes.

In the paper [DAO democracy](#), the cryptographer [Ralph Merkle](#) describes how the [wisdom of crowds](#) combined with DAOs can open up for a new form of stable democracy able to use the expertise of its citizens to make high-quality decisions ([watch interview with Merkle](#)).

Self-Sovereign Identity

Despite a lot of attempts to create an internet ID, it is still not possible to surf the Web without being asked for a username and password again and again. Furthermore, the “sharing” platforms like Uber and Airbnb collect information about our reputation without us having ownership of the data and without us being able to transfer it to other platforms.

Web3 will finally allow [legal persons](#) to create their own unique identifiers and attach information to them in a way that makes it possible to prove, they are genuine. It is called a "[self-sovereign identity](#)" and can not be taken away by any authority. Every legal

person can hold several digital identities - for example, one for professional use and one for gaming.

The information that can be attach to an identifier is:

- *Social identity attributes like name, date of birth, address and marital status.*
- *Biometric identity attributes like photos, fingerprints, iris scans, and voice patterns.*
- *Credentials like national ID, passport, and driving license, issued by government authorities.*
- *Credentials issued by third parties like a health certificate issued by a doctor, a job reference issued by an employer, a diploma issued by a university, and a car ownership certificate issued by a car dealer.*
- *Family, circle of friends, payments, preferences, reputation, etc.*

Anyone with a self-sovereign identity can issue or “notarize” a credential and can [cryptographically](#) verify it.

The information attached to a self-sovereign identity can be analyzed and monetized in such a way that the identity is not exposed ([see how](#)).

Multi-stakeholderism

The [United Nations \(UN\)](#) is built on the principle of [multilateralism](#): “one state, one vote”. A governance system that, unfortunately, has resulted in an extremely inefficient and impotent institution. So, when the first Internet protocols were developed, a different approach was chosen: The Internet protocols are [governed](#) following a [multi-stakeholder](#) model which, unlike the multilateral model, is a non-hierarchical, polycentric approach with the participation of not only

governments but also NGOs, businesses, civil society groups, and individuals.

The initial ambitions for Internet governance were quite modest and limited to agreeing on how to access information and how to exchange electronic mail; but the process is still evolving. For example has [ICANN](#) - the organization responsible for the Internet “phone book” - transitioned from the US government to an independent global community.

Now the Internet is facing a big new challenge: All analog protocols of this world must be transformed into digital ones. We must create a world where policies are not written in national laws, but encoded into the the Internet.

This decentralized governance system is likely to unfold via a lot of international organizations, government institutions, enterprises, private communities, consortia and individuals, that compete to produce new protocols for personal identity, file sharing, supply chain management, global ledger book-keeping, taxation, decentralized finance, property registration, and so on.

They will definitely come up with many different solutions to the same problem, but instead of endless discussions over, which solution is the best, they will hopefully build interoperability between them. At some point, the protocols will become robust global institutions run by stakeholders and by DAOs.

The Global Ledger

Just like every legal person on the planet will have an ID on the Internet, so will physical objects. Exchanged goods - down to a single

shirt button - will be accompanied by a digital a certificate telling how they were produced and what their environmental impact is throughout the supply chain.

When all transactions of assets, goods and services are registered on a *Global Ledger*, there is no reason for companies to waste time on book-keeping. All economic transactions are generated automatically, all payments (including taxes) are streamed in real time, and the balance sheets are accessible at any time. Annual accounts, tax returns, and VAT-accounts will belong to the past.

The Internet of Agreements

When citizens, companies, commodities and assets are identified on the Web, we will be able to move from a world where international trade is regulated through national laws, to a world where trade is harmonized through an [Internet of Agreements](#).

Multilateral trade agreements, conflicting jurisdictions and overburdened courts will be replaced by a system of "smart agreements" that offers reliable dispute resolution including enforcement through [on-line mediation and arbitration](#).

The agreements of the future can take the form of written legal documents with embedded smart contracts, that automatically execute the contractual promises. These hybrid agreements can be signed digitally and stored on a distributed ledgers as immutable documents (see [OpenLaw](#)).

Public Goods and Services

In a not-too-distant future, many [public goods](#) and services may be funded via [funded via token models](#) and operated - not by government employees - but by cooperatives of social workers, health personnel and teachers, or by autonomous organizations controlled by the users. Citizens can freely choose their preferred suppliers and pay with money from their own pocket, from a community insurance DAO or with social security tokens.

Nor is there any reason for the state (or private companies) to supply the population with transport, water, data, electricity, etc. These utilities have historically been organized on a community basis, and with DAO technology, they can become so again.

In my neighborhood, residents can purchase an annual parking permit from the municipality. However, since the license does not cover the real price of the parking lot, non-car owners, involuntarily, subsidize car owners. Instead, the municipality could issue day-tokens corresponding to the area's parking capacity and distribute them equally and free of charge among all adult residents, regardless of whether they own a car or not. Owners of vehicles could then buy parking days on an open marketplace at prices based on supply and demand.

Taxation

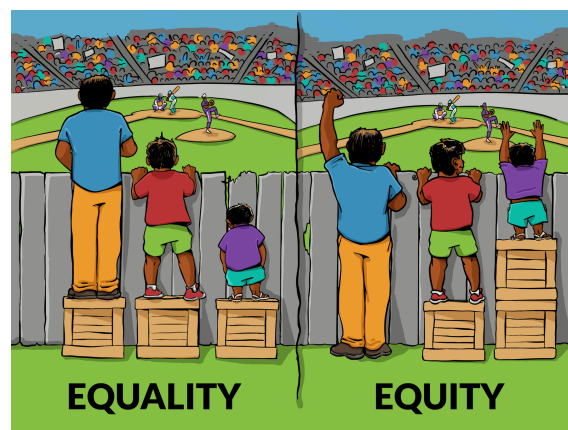
National tax authorities are collapsing all over the Western world. They can no longer keep up with the internationalization of economic crime and tax fraud.

Fortunately, in a world where all assets are tokenized, it is relatively simple to imagine a system that automatically tax dividends and increased asset value. It is also a no-brainer to introduce an automated tax on financial transactions ([Tobin tax](#)).

One possible way to tax property is a "[Harberger Tax](#)" that works as follows:

- The owners themselves determine the value of their properties and pay tax on the value.
- To prevent the owners from setting the value too low, everybody can, at any time, purchase the property token at the valuation price.

There is no reason for the tax revenue to be distributed via a state. When sovereign states are replaced by sovereign citizens, the tax money can go directly to the citizens and their communities.



Social Welfare

To make sure, that social welfare reflects cultural and geographical differences, it could be detached from the nation-states and organized in autonomous "*welfare funds*" i.e. virtual organizations controlled by the users and financed via automated taxation.

Nation-state welfare systems like the Danish suffer from several weaknesses:

- They create tensions between permanent residents and immigrants over access to social benefits.
- They tend to focus on [equality, not on equity](#).

- *Danish citizens are not covered while they live abroad.*
- *Social expenditures are used by governments as [austerity](#) instrument*

Global Basic Income

Due to the great cultural and geographic differences of the globe, it does not make sense to pursue an objective of global equality.

However, it is by all means possible to imagine a global equity based "[global basic income](#)". Assuming all basic needs are met, humanity should strive for equity and fairness, opening up for global diversity rather than uniformity.

Part 8: Africa - The Continent of the Future.



Some statisticians fear that Africa's population will double by 2050 and quadruple by 2100 ([source](#)).

Sub-Saharan Africa is hit hard by global warming, despite bearing the least responsibility for the problem. Africa accounts for less than 3% of the world's energy-related CO2 emissions and has the lowest emissions per capita of any region ([source](#)).

Furthermore, the continent is suffering from the economic consequences of both COVID-19 and the war in Ukraine. Extreme poverty is growing and the African continent will experience serious problems in the short term. Many of the [artificial nation-states](#) created by the colonial powers are likely to go bankrupt and disintegrate ([source](#)).

But the continent is favored by an abundance of solar energy as well as considerable human and natural resources, that could, with the help of new technology, make Africa the continent of the future.

Basically, the future of the African continent depends on the ability to convert the abundant solar power into food, water, energy, fertilizer, communication, reforestation, and education. Africa is one big [power-to-X](#) project.

Africa is "cosmopolitan", and the economy is informal - neither regulated, nor controlled by a state. Africans are the most multilingual people in the world, they have a high degree of religious tolerance and are generous and hospitable to strangers.

But most of them don't have credit cards and they don't trust each other. They are just waiting for Web3 and its ability to build trust between people. The continent is ready to skip industrialism and go straight to a mode of production, where institutions are replaced by algorithms ([source](#)). Africa can potentially leapfrog "Western civilization".

The Networked Continent

Africans already skipped development stages with the mobile phone, and they are global leaders in bank-less digital payments ([source](#)).

Now solar energy can lead to an even bigger jump forward. Rural areas are being electrified with "mini grid" and "off grid" solar energy whereby hundreds of millions of peasants get electricity and access to the Internet.

Tesla is introducing a new 5G phone ([Model Pi](#)) that act as a WiFi router connected to the [Star-Link](#) satellite system.

Since Africa is not hampered by a lot of existing institutions slowing down innovation, Africans can move very quickly to Web3. When they get a digital identity and a deed on their house and land, they get access on-line loans, digital cash and e-commerce just as we have in Europe. Entrepreneurship and local economies will flourish.

In 2002, my wife and I arrived in Pemba, northern Mozambique, to work on a development aid project. It was the day before the mobile network was launched and, all who could afford it, walked around with a telephone in hand and kept an eye on the new transmitter masts.

The next morning, when the signal came on, they started calling each other, and despite the fact that a large part of the population was illiterate, they quickly learned to send text messages.

The phones were quite cheap, so the prepaid calls turned out to be the expensive part. However, if you had no "credit" on your phone, you could send a free "beep", which meant, you wanted to be called. Soon after, it was discovered that prepaid credit could be transferred from one telephone to another. In this way, mobile payments were invented as part of the most accelerated development process I have experienced in my years in Africa.

African Governance

As part of the colonial heritage, Africans are highly skeptical of state authorities. Instead, they rely on the extended family and the tribal elders.

And the tribes are ready to take over from the corrupt nation-states. In fact, they never relinquished power. The colonial powers, and the aid organizations, just did not notice it.

Most African tribes live relatively peacefully together, so it will be no problem for tribal-based nations to share territories. They may well abide by common traffic laws while having their own tokens, their own schools, and their own health insurance.

Carbon Farming

Traditional African agriculture contributes twice to global warming: First through direct emissions of greenhouse gases from cattle farming and [slash-and-burn](#) agriculture, and then through deforestation, which for the most part is a result of the same agricultural activities.

If we manage to reforest the African continent, the effect on climate and biodiversity is estimated to be bigger than the effect of all the solar cells and wind turbines of the World ([source](#)).

The land is traditionally cultivated by women, so to raise productivity, women need to learn, that an agricultural robot can be a better investment than an extra child. Education and prosperity for women is the best form of family planning.



As food gradually becomes farm-free and the amount of farmland in the World starts to decrease, carbon dioxide could become the next [cash crop](#) for African peasants who potentially could reforest the whole continent financed by [carbon credits](#) (market-based carbon taxes).

A credit token could be [minted](#) by a [DAO](#) each time a custodian satellite monitoring system - like [Climate Trace](#) - confirms that the number of cattle is reduced corresponding to the emission of one tonne of CO₂ or the members have planted trees equivalent to the uptake of one tonne of CO₂. The credits are sold on the open market or can even be used to back a stablecoin like [Klima DAO](#).

Solar Farming

The climate change exhibits our lack of global understanding. For example, it makes no sense to base the Danish climate strategy on the production of [e-fuels](#) from electricity produced by wind turbines on Danish territory. As we know, climate change does not care about national borders, so why not invest the same money in solar cells in the Sahara? It is more efficient and much cheaper. The ships that transport - and burn! - the green fuels, still sail close by.

E-fuels could become another cash-crop in Africa. Again, the model could be to organize cooperatives, which assemble, clean and maintain the solar panels. The investment can be crowdfunded so that we in Europe buy NFT panels, that are put up in the Sahara instead of on our cold rooftops in the North.

According to "The International Energy Agency", Africa could power the world: The continent has the potential to produce 5 000 megatons of hydrogen per year at less than USD 2 per kilogram - equivalent to global total energy supply today ([source](#)).

Solar farming can possibly be combined with an African variant of [vertical farming](#) where the plants are grown in the shade of the solar panels and drip irrigated with water extracted from the air or through desalination using surplus energy from the sunniest periods.

How Europe Can Bootstrap Africa

As we in Europe are slowed down by many old institutions resisting to change, we should bet on Africa. The alternative - not doing anything - is not attractive, as Europe will be the destination for colossal refugee and migrant flows if the climate and population crisis runs free on the African continent.

Finally we have the tools to stimulate real development: With digital cash, we can put money directly into the pockets of the poor, as opposed to old-fashioned development aid which often ends up in the wrong pockets. And when the poor get money, they spend it and create real development.

We could offer to [airdrop](#) a small "[basic income](#)" of one Euro a day to all adult in Sub-Saharan Africa (corresponding to approx. 2% of the EU GDP). Such a program will boost Web3, put an end to extreme poverty, dampen migration, reduce the fertility rate, and bootstrap African entrepreneurship.

This digital cash - for example a stablecoin pegged to the Euro - could outperform the dollar as the reserve currency in Africa. It should be transferred directly from the European Central Bank to people's phones, bypassing governments and other intermediaries. It could be programmed in such a way that it, outside Africa, only can be spent on purchases in the EU.

The program is a purely monetary operation, which does not necessarily lead to increased taxes in the EU. It is similar to what the Americans have been doing for the last 50 years: print a lot of money and increase the international demand for your goods without increasing the domestic money supply.

Let's help Africa bring the World one big step closer to "[Global Civilization](#)".

End note

September 2022

I thank Hans Genefke, Christian Liisberg, Joergen Lindgaard Pedersen and Troels Plenge for inspiration and encouragement. I have been happy to follow Denis Rivin's good advice and ideas and am grateful for Francisco Santos' careful and critical review of an early version of the paper.

Don't forget to share this paper with others and your comments with me.

Best Regards,

Jens V. Svendsen

www.jenssvendsen.dk

mail@jenssvendsen.dk