The Price Of Tomorrow

Why Deflation Is The Key To An Abundant Future

Jeff Booth

# PREFACE

WE LIVE IN an extraordinary time, where there could be global prosperity

In a world that moves faster than we can imagine, we cannot afford to stand still. We cannot afford to cling to systems and pretend they are working

It is not reasonable to believe that what will work in the future should necessarily be built on what work in the past.

It was an upbringing that allowed me to see a different world than many people see and then build on the edge of that knowledge.

I was never afraid to ask a big or seemingly crazy question.

That curiosity. Combined with a drive to create something better in the world, was a start of an incredible adventure as an entrepreneur, an adventure that has had me alongside and inside some of the top technology companies globally.

Talent is distributed evenly around the world, but opportunities are not.”

Leading a technology company for nearly twenty years, through the dotcom meltdown, the 2008 financial crisis, and many waves of technology disruption has given me a unique insight on technology disruption has giv

Like all of us, make mistakes, but common in every one of them is a genuine desire to help.

The opportunity to create something better comes from observing something broken or that doesn’t work the way you believe it should. That, oftentimes, creates the highs and lows of the entrepreneurial adventure because even if you are right, change is never easy.

Those choices compound and sometimes we don’t realize, or we forget, that we control our own thoughts, and we control our time.

I am in the fortunate position to spend my time helping some of the most extraordinary technology entre

I have a rare view to many of the changes underway that promise a better tomorrow.

Democratize this asset class and lets people own real estate for as little as a dollar.In a world that is becoming more unequal, giving access to a generation left out could help stem the tide.

Far better choice, value, and simplicity than could otherwise be achieved.

Almost every company I’m involved with is in some way using artificial intelligence to make better decisions. Many of the companies create success by removing massive inefficiency in the market. Unfortunately, projected forward, that comes at the expense of the jobs of today.

Fewer winners and more losing out unless there are massive new industries created.

The thesis of this book is something that I have been following closely for almost a decade, talking about it with family friends and watching things unfold as expected-like signposts on a road, knowing what the next sign would sayAt the same time, **I was hoping I was wrong.**

Ciety Deneve-something I must do, because technology changes the operating system of the world we live in. That operating system-the rules by which we have built our wealth and economies-will need an overhaul, and there has not been sufficient debate or dialogue.

# Introduction: The End of Inflation

It foretells, but it doesn’t change the facts. By technology where prices keep falling. They were built for a pre-technology era when labour and capital were inextricably linked, an era that counted on growth and inflation, an era where we made money from scarcity and inefficiency. That

We are at a critical point, because many of our choices are fact choices about economics.

The seemingly random events of Brexit, Trump, and a rise in populism and hate in our world are not haphazard or isolated at all. They are all connected to a loss in hope for a better future for large portions of the population.

Instead of technology allowing for a fifteen-hour work week, as Keynes predicted when he penned his 1930s essay “Economic Possibilities for Our Grandchildren,” vast numbers of people are working longer, in jobs they rightly fear will soon be gone.

The world naturally becomes more unsafe when large amounts of people with increasing anxiety about their own economic future see incredible wealth creation in hands of very few people.

The trend of more wealth inequality, more polarization, and more discord is a major threat to our collective future.

## The age of inflation

All of our lives, we have lived in a world where hope for a better future was a motivating force in economics-a world where growth reigns.

Almost any asset shares the same fundamental story, whether those assets are stocks, resources, or art. And there is nothing fundamentally wrong with the equation. It has driven enormous wealth and prosperity. True, asset owners have prospered more than others, which has contributed to have prospered more than others, which has contributed to inequality but overall in the world, this process has driven much of the world out of poverty:

What if, by desperately trying to cling to an outdated inflation model, we drive more wealth inequality, more polarization, and more discord into our societies?

Technology is a deflationary force so great that, in the end, nothing we do will stop it.

## The shrinking world of technology

Deflation, put simply, is when you get more for your money just as inflation is when you get less for your money. With deflation, a currency becomes more valuable because its buying power goes up in relation to goods and services.

The problem is that we still think that deflation is restricted ! parts of our economy that we will keep getting more with less in our electronic devices while getting the benefits inflation in the rest of our lives.

We continue to get more for less.

With the natural deflationary trend in technology. Would allow us to step off the existing treadmill chasing higher and higher prices, requiring ever-higher paying jobs to keep up.

It may not be radical at all. It may be the only sane thing to do.

## Reactionary economics

To anyone living in this environment, it is almost impossible to believe in deflation or the abundance that might be possible with it.

But this rise in prices is artificial-driven by an enormous rise in credit and debt.

Any real growth the world has seen is only because of an unprecedented spending spree fuelled by easy credit and debt that masks | what is really happening underneath. TEe problem comes from believing we can outrun deflation and the natural order F of things by creating more and more debt.

A government brings its debt under control by no longer funding a program, but that stop in funding forces debt to accumulate faster in consumers who need the program; through total debt you will see the real impact on GDP.

There is already too much debt in the world, which paradoxically makes the problem harder to solve. Debt combined deflation is a toxic combination, because borrowers have to pay the same for their interest payments while earning less.

In other words, it has taken approximately $185 trillion of global debt to achieve $46 trillion of global growth.

The mirage of growth today is nothing more than a debt fuelled spending binge.

A business that takes on debt to invest in automation gains more leverage against its competitors and can pay back that debt with a better return to the business in the future to that automation. But

Dalio concludes that in the end, “Policy makers always print. That is because austerity causes more pain than bene fit, big restructurings wipe out too much wealth too fast, and transfers of wealth from haves to have nots don’t happen in sufficient size without revolution

I just do not believe that is the right solution this time. It will only make things worse.

What no historical record of previous debt crises could show is the incredible deflationary force of technology. It is different from historical transitions like the Industrial Revolution, and moreover, it has only barely started.

For a future without precedent. Where the rules need to be rewritten.

Today, it is difficult for any individual, let alone those outside the technology industry, to keep up with rate of technology growth.

# 1. How the Economy Works, | Part 1: Printing Money

## What the experts got wrong

Years of loose credit coupled financial engineering wizardry created an unprecedented with financial engineering wizardry created an unprecu to unwind, the interconnections that caused the run-up unwound as well. Those interconnections were global in m inwound as well. Those interconnections were glodai

With credit continuing to advance globally, it is only a shell same as to where the next crisis originates.

Financial system based on credit is just an exchange of A financial system vastu vi.

## The world in balance

China cannot reasonably stop buying government bonds without collapsing its own economy; because then interest rates would move much higher in the US and cripple consumer spending, which would then collapse China’s economy. It’s a feedback loop in interconnected economies.

It doesn’t address the root cause for the jobs disappearing: technology. It also doesn’t allow focus on the most important jobs or things that must be done to enable the future.

## The Ponzi economy

When debt is growing much faster than a country’s econat what point does the music stop? It is often difficult see, because asset price inflation can make individuals, companies, and even countries feel much better off than they are.

When that stops, which it eventually will, things will change very quickly.

## Cheap money

Many people refer to the first part as “printing new money,” though the money does not actually need to printed-it can just be given as balance sheet credits by a central bank. Fo

The second part, delivering the newly created money into economy, is done in a variety of ways, such as large-scale purchases from public and private sectors like the Troubled Asset Relief Program, where the government buys toxic or underperforming assets.

Another way to get new money into the system is through directly issuing loans to commercial banks. In the United States in 2008, banks were given access to borrow federal funds at a 0 percent interest rate.

Eight, or dividing an estate announcement of the first round of quantitative easing, the US dollar lost value, and other currencies where easing was prominent also fell and remained in equilibrium to the US dollar.

Other countries with large natural resource sectors—like Brazil, Russia, and Saudi Arabia-also saw their currencies rise. And along with that, their own labour rates rose relative to the Us.

A country that devalues its currency also indirectly lowers its labour rate against global competitors, which can help some job growth the short term, because its goods cost less to buyers in countries.

Other countries trying to compete for the same scarce jobs devalue their currencies to keep their economies from collapsing.

And the endless game of reducing the value of currencies relative others only serves as a short-term panacea, because asset prices will rise far more quickly than jobs can be created-and pay rates increased-to keep pace with the asset price rise.

As the economist John Maynard Keynes wrote,

Lenin is said to have declared that the best way to destroy the capitalist system was to debauch the currency. By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens. By this method they not only confiscate, but they confiscate arbitrarily; and, while the process impoverishes many, it actually enriches some. The sight of this arbitrary rearrangement of riches strikes not only at security, but at confidence in the equity of the existing distribution of wealth.

The inflation proceeds and the real value of the currency fluctuates wildly from month to month, all permanent relations between debtors and credThe ultimate foundation of capitalism, become so utterly disordered as to be almost meaningless; and the process of wealth-getting degenerates into a gamble and a lottery?

## Changing the rules

To protect American farming jobs from foreign competition, the passed the Smoot-Hawley Tariff Act, named after the congressmen who conceived it. That act raised tariffs to protect but dramatically underestimated the reaction from other countries in doing so. They were foolish to believe that they could keep their existing exports while protecting their own economy from imports.

The resulting trade wars, with Canada and Europe retaliating and increasing tariffs on us goods, are widely understood to have prolonged the Great Depression made it worse very farmers that the tariff act was supposed to protect.

As Paul Volcker, former chairman of the Federal Reserve, in 2018, “The central issue is we’re developing into a plutocracy. We’ve got an enormous number of enormously rich people that have convinced themselves that they’re rich because they’re smart and constructive.”8

A market where government reaches in decide who wins or loses is nothing more than crony capi talism, where wealth is not created by the value you create and the risks you take to get there but by a political system that risks you take to get there but by a political system that rewards its insiders.

# 2. How the Economy Works, Part 1: Creative Destruction

Information doesn’t have the same constraints that physical goods have: it travels seamlessly across borders. It is much more efficient, eradicating a lot of waste from the system. But much of that waste and inefficiency are our jobs.

## Out with the old, in with the new

י near-constant flow of innovative entrepreneurs breaking monopolies and then themselves creating new ones, The paradoxical term "creative destruction” was coined for this paradoxical term "creative destruction

New technologies often change what is valuable in a way that is misunderstood by incumbents who have spent years perfecting their own playbook to win markets.

## The BuildDirect Journey

Partners and debt we took on to finance our technology came with certain debt we to Their understanding of growth was different; their timelines for return were different; their appetite for risk was timelines

In that formulation, the riskiest proposition of all is to lose sight of who I was. To betray myself was the only way to truly fail. And for that reason, I left-with nothing but with everything.

## The windows of opportunity

If the windows that open are small, it is more likely that successful entrepreneurs are early, not late, which requires them do whatever it takes to keep their businesses going until the market arrives.

Ten years ago (2010)– many of the top companies in the world were started in the many of the Today, the list is dominated by technology plat: forms taking advantage of network effects and data capture to enhance their services.

## The rise of the platforms

The new super monopolies, have been created by understanding the ways in which the world has changed–where the power is held has changed and the former monopolies find it hard to compete in

Strong network effects are at the core of every platform

70 percent of the value in tech- †

More value to each user as the number of users increases. A tel

The service becomes more valuable to all users, which in turn creates a positive feedback loop of value leading to exponential growth.

Ironically, network effects, which were supposed to make the Internet the great equalizer as it redistributed power away from monopolies, have ended up concentrating even more power in the hands of very few.

Most people falsely believe that the majority of power is gained through consumers of the platform.

Secret common to all of them is that they derive the value they give consumers by their focus on aggregating supply

Supply can take many different forms, but the pattern is remarkably consistent.

A team behind it doing what they can to rise to the top of the search rankings.

Primary benefit is choice and unique content or products. They don’t need to go anywhere else. The secondary effect is more important: it creates competition, which drives the suppliers to compete for users’ attention.

Competition enables a better buyer experience because the highest converting products or services naturally rise to the top. The competition also provides vast and differentiated data to apply machine learning. The

Immense value to users through access to a unique supply immense value to users through access LU a very la their listings stand out by various means like better photos or feedback scores that, in turn, deliver increasing value to users, |

Wrote a blog post in early 2008 titled “Why Every CEO Needs to Be on Twitter.”

Something extraordinary happened: after using the service for months before that with limited interactions, my Twitter account exploded gaining over 1,000 followers a day. It took some time to figure out had happened. Then a friend sent me a screenshot of his Twitter onboarding process: there was a list of ten CEOS that every new Twitter member should follow. There I wasthe only one of the ten that didn’t belong on the list. Right between Richard Branson and Bill Gates.

That one blog post the subsequent actions by Twitter drove my followers to than 185,000 almost overnight.

That example shows that standing out early on a platform can yield impressive results, creating broad distribution and reach where there was none before.

With that competition, the platform starts to gain more leverage in pricing power over the suppliers and each supplier is forced to work harder to keep up.

We can have all of the choice we want, if we look for long enough, but because of our limited time, we trust what Google puts at the top of the results and rarely go to even the second page.

And so our company was doing more and more and getting less and less-unable to get off the wheel, having relied on it as our primary channel.

Through the journey, I also realized that in a competitive world, there is always a company that will pay more than One day: with an enormous cost and deteriorating returns, the steamroller will run over you.

The overall dynamic is why most platforms are monopoly businesses. Early on, the potential results are too impressive for supply to overlook the opportunity. Later, all the buyers for supply to overlook the opportunity. Later, all the buyinvolved. The

In the past, monopolies were often broken up because of their negative effects on consumers in the form of increased pricing or constraining markets. The monopolies today are constructed differently and do the exact opposite for consumers.

## On the eve of destruction

: The “Minsky moment” is the tipping point where the debt-fuelled asset bubble collapses, assets become difficult to sell at any price, and a market collapse ensues. Interestingly, though, Minsky didn’t forecast a write-down in debt.

Minsky realized that even governments that preached free-market rules, when faced with a systematic collapse, would always act as the lender of last resort and bail out the market. I n In effect, he believed they would be forced to do so because not doing so would cause too much short-term pain.

This means that not only does Federal Reserve action abort an incipient crisis, but it sets the stage for a resumption in the process of increasing indebtedness-and makes possible the introduction of new instruments. &gt;is

Is where I believe Minsky and Schumpeter converge. It is not the debt itself that acts to undermine capitalism. It is the act of stabilizing an economy through socializing the losses when faced with a collapse that undermines capitalown institutional framework.

Nassim Nicholas Taleb cleverly points out in his book Antifragile, “Small forest fires periodically cleanse the system the most flammable material, so this does not have the opportunity to accumulate. Systematically preventing forest fires from taking place ‘to be safe’ makes the big one much worse.»16 B.

Monopolies that have flourished for a long time are often impending transition. Tipping points can come from anywhere and can come quite suddenly, often with little warning of the cascading effects.

# 3. It Is Hard to Think Differently

Only 400 years ago, Galileo Galilei enraged the Church by suggesting that the Earth might not be the centre of the universe.

The spread of disease were attributed to witchcraft when the true source was hidden from view.

J.B- Sanford, senator, chairman “Let her be content with her lot and perform those high duties intended for her by the Great Creator, and she will accomplish far more in governmental affairs that she can ever accomplish by mixing up in the dirty pool of politics. “ 17

Will the economic dogma of today that growth is always good, no matter how much you change the rules to get it-look as irrational to historians of tomorrow as geocentric cosmology, the burning of witches, or voter inequality are to us today?

## Building on weak foundations

We rely simple frameworks or mental models so our brains’ limited energy can be directed into what we deem most important don’t get bogged down in questioning things that we ready know.

If you had to consciously think through task again and again, you would be exhausted before You left the house. The ability to learn and assimilate information frees up your brain to think about more important things.

Even realize when the foundation itself is weak. Amount of information, we can easily become blind to impor tant information, caught in our own bubbles, disregarding some information or alternative views, even when it might it be helpful to us.

It also means that we can often only see what is right in front of us without seeing the larger forces that shape our lives.

Experts may not see big changes coming because they, too, are human beings with the same cognitive biases as all of us, thinking along established paths.

The beginner’s mind asks why with the intent to discover the answer and not to defend a previous reality- It

A Kodak employee, Steve Sasson, actu- i ally invented the first digital camera in 1975 and the first DSLR camera in 1989. Both times, he pitched executives who failed to see how the digital camera would shape the future of the y industry. They were so caught up in their framework of protecting “film” sales; it is easy to see why. And so after thriving for more than 130 years, Kodak filed for bankruptcy in 2012.

Sears actually invented the mail-order catalogue business in 1892. Before that, consumers had limited access to mass produced goods.

## Two-speed thinking

We are often confident even when we are wrong, and an objective observer is more likely to detect our errors than we are.”18

The status quo is something that they do not want. It doesn’t just happen to individuals; it happens in systems, too. I personally believe that the sunk-cost bias is making us hold onto an economic system that is clearly failing for fear of loss of status quo.

Walmart became the king of retail by relentlessly driving bet ter selection and value for consumers. The executive teams

A store-even a large one-is constrained by shelf space. There are high costs to your stores and limits to ucts. When there are high costs to your stores and เบ To pick the best products, you must hire merchandisers to wade through the vast supply.

The gatekeepers of the products, the choosers, believe that they are really good at the job because of the self-reinforcing mechanism of the demand in their stores: consumers can’t choose what they don’t see.

Jeff Bezos - “Almost never get the question: ‘What’s not going to change in the next ten years?’ And I submit to you that that second question actually the more important of the two-because you can build a business strategy around the things that are stable in time.”

-imagine if you were in their shoes. Imagine it was your business and what you would do when most of the profits still come from stores, but the future is in digital.

## Myths we live by

Joseph Campbell, author of the 1949 book The Hero with a Thousand Faces.

Theory is based on his observation of a com mon pattern behind the elements of most stories, regardless, their origin. It is found in all mythologies and religions. He calls it “the Hero’s Journey” or “monomyth.” We see it everywhere, and we expect to see it everywhere.

Hero who goes on an adventure, faces almost insurmountable obstacles, wins a victory, and then comes home transformed. It

1. The Departure - typically reluctant to follow the call but is then helped by a mentor.
2. 2. The Initiation Where the hero faces much adversity and | ordeal, eventually reaching the main obstacle or central crisis of his adventure.
3. 3. The Return-Where the hero returns to the ordinary .

We see the hero in ourselves and root for them. In that connection, it becomes a story that we remember and pass on. It is easy to understand why this type of storyline is so compelling. Before the ability to mass record our knowledge simple compelling narratives were the | only way to transmit our knowledge to the next generation.

The problem, though, is that because we don’t question our own stories or beliefs very often, we are bound to continue to believe in something even when it makes no logical sense. Worse, because these stories are so powerful in our minds, we can use those simple narratives to define others | as villains, whether they belong to a different religious group, company, or other.

The adventure is difficult, and hard lessons are learned, often changing the entrepreneur. For the story to make sense, though, there needs to be an obstacle to overcome-the bigger the better, wh ether that obstacle is villain or otherwise.

Faced with a challenge but unwilling to deal with the real problem, we create a false villain and project the struggle on them. Instead of accepting the changes to our life we need to make to deal with a new world reality, for instance, we may decide some group of “others” are at fault

## How do we overcome our errors?

Especially in a time when there is ever more information competing for our attention, attempting to influence our thoughts

Even if we accept that we are prone to errors in judgment, how do we know when to dig deeper?

Avid readers and learners, especially those who study across various fields, will tell you that they read diverse topics so they can connect patterns across disciplines or industries. From this practice, they train their brain to recognize opportunity, seeing what worked

Another way of error correcting for these natural biases and stories, according to my friend Bob Sutton, is to argue as if you were right, but listen as if you were wrong. Bob is

Leaders inspire confidence in teams to contribute new ideas and challenge the status quo. Instead of leadership having their heads in the sand, the best ideas win.

This combination of bold moves followed by constant reflection allows for a learning and feedback cycle, which ultimately allows leaders and their companies to error correct at a faster rate than would

Their wisdom comes from an increased learning with commitment to feedback from anywhere or anyone.

# 4. The Technology Boom

Dinner one night, my parents asked me to consider which I would rather have just hypothetically, of course: a million dollars on the spot or a penny that doubles every day | thirty-one days. I

-I made the same mistake that nearly of us make. I couldn’t imagine

Just how wrong , I was. I was sure I would not make this mistake again.

## Doubling up

Beyond just the doubling of computing power, we should expect a percent annual decline in price to performance.

According to Computerworld magazine, the cost of one megaof hard drive memory has fallen from approximately $1 million in 1967 to 2 cents today 21

Is hard to see how it is possible

Advances we see around us today are due to the past doubles,

All of what we have had in the last fifty Years. Eighteen months to two years after that, it will double again. Instead of taking little steps on our way to the sun, we are now taking massive leaps.

Oral traditions to photocopies-digitized data does not lose fidelity as it is reproduced or moved. Once digitized, stored and backed up to the cloud, and subsequently backed up across data centres, information is there forever.

Other data, too, is moving out of its previous silos, giving rise to an intelligence that can be combined with other data sets to learn at a rate far faster than humans.

Important information. All of this free with a cellphone connection.

Remember that the underpinnings of the technology revolution are continuing to double.

## Self-driving cars

With global research and development budgets accelerating in the field, level 4 autonomy should be widespread by 2025. The current utilization rate of an automobile is estimated at § percent This means that 95 percent of the time you own your car, it sits idle in a parking garage or driveway.

If I do buy a car, allow it to be used by others to help me pay for the asset I own. With either choice, utilization rates on cars should move much higher.

Most likely that adjustment will have them selling cars as a service option, similar to software-as-a-service models in technology today.

A utilization rate increase means less demand for automobiles.

That race is important because density &gt;f the network (availability and choice of car types) will be the consideration to rapid adoption.

The amount of parking designed into cities is staggering.

14 percent of land in Los Angeles County is commited to parking. 23 You need room for parking while your car is at home as well as at each area that You and Your car travel

Spaces are often unused but are still required for peak times

When the utilization rate of cars increases from percent, the amount of storage needed to park cars while in use plummets, which frees up valuable land-which ill affect land use and prices, which will affect density, which feed back on car use…

Remove human error. Approximately 94 percent of automotive accidents are caused

A technology that reduces costs so significantly and produces better outcomes is again deflationary in nature and, because of market incentives, impossible to stop. For now, we have both the overhead of the existing legacy system in drivers

The technology moving into the mainstream, the transition will happen and drive much waste and cost out of the system. This can be great for humanity. The problem is that waste and

## Virtual and augmented reality

By twinning the real world via satellite imagery, drones, and lidar, and adding global positioning, mapping, other data streams, the company uses mixed reality to reduce the cost of planning and work in the physical world.” It allows for remote analyzing of massive amounts of data without traversing faraway sites with people.

Those savings come directly from inefficiencies in travel, surveying, and mistakes caused by not seeing integrated information.

Feels like something that is hard to “unsee. By that, I mean that it is difficult to explain how quickly you that, I mean that it is difficult to explain now quickly yo experience a different world, one that feels very real.

He explained his thesis, which was first introduced by Nick Bostrom, philosopher and author of the book Superintelligence, by using virtual reality/ augmented reality as an example.

Musk went on to ask what the chances are that this is the first time we have created this technology. Making the case that if it were not the first time, we would not know it because were part of a simulation. He then went on to conclude he thought that “there is a billion to one chance that we are living in base reality

We don’t believe can happen because our minds project the present reality to the future, dismissing the present technology as inconsequential.

According to the World Travel and Tourism Council, in 2018, travel contributed $8.8 trillion and 319 million jobs to the global economy. Entire local economies

## Additive manufacturing and 3D printing become reliant on tourist dollars.

That image, of a printer slowly layering plastic into a rudimentary product, has been etched into our minds because reality was so far away from the promise.

Minds DELL v included, dismissed a world where anything could be printedt in our living rooms as a faraway dream, and the hype cycle of additive manufacturing ended.

And in addition to speeds of printing that are improving exponentially, the list of materials that can be used in additive

It becomes much more economical to print locally. Entire infrastructure that exists to support movement storage of goods will no longer be needed.

These are not isolated pockets of disruption anymore. Not just industry or market but all of them-together-at the same time,

Their adoption will in some way or another power almost everything else-giving us the continuing doubling of technology progress and, as a natural derivative of it, a doubling of the deflation rate in prices falling and jobs disappearing.

If there is no net job creation globally (more global jobs relied on for commerce throughout history cannot continue.

## The coming sonic boom

Unless global jobs and our economies expand at a rate that exceeds debt creation (which the age of inflation is already over. We just don’t know it yet.

The growth rate would | likely have been negative without all of that stimulus.

Massive drag on future growth because o f interest payments on it. What about when we add another $555 trillion? With the incredible amount of debt today, slowing growth or asset price deflation would create a brutally negative feedback cycle things unwind very quickly.

The only way out is to hit the reset button

Ton. truth is we have probably already passed that point at which a complete reset is required.

The metaphor of a sonic boom is akin to what we see at some point with debt creation when the rules will change instantly.

We should therefore expect more easing, and more chaos it, as the can is kicked down the road once again.

People feel richer and spend more, which turn creates more jobs because their spending drives the economy. Growth would not have been nearly the same without it and, therefore, many of the benefits to society would not have accumulated as quickly without it.

Easy credit resulted in a significant rise in prices across asset classes-home prices, oil prices, stock prices, to name a few-creating real wealth for the holders of assets and spur even more growth, with countless jobs being added to | growth sectors of the economy that have been aided bY easy credit and low rates

Venture capital and technology companies themselves have benefited greatly from this cheap source of capital in raising giant venture rounds, meaning that some of the technology progress and feedback loops themselves were quite likely accelerated beyond what would have otherwise been possible.

It is a fact that we better get used to if we want that same abundance in our lives.

# 5. The Future of Energy

At what point along that price-versus-value curve would consumption of energy change&lt;9 That choice will drive future of energy and it has the potential to change our lives in a very positive way.

There is no life on Earth without energy- Every living plant creature on Earth consumes energy for its survival.

Distribution, and therefore, its use has a huge impact on the competitiveness and growth of our economies.

Energy is naturally a very large part of our economies, coming in at about 2 GDP globally 2

9 9 percWe still need to factor in how much of the world’s military complex is built mainly to ensure continual access to energy at reasonable prices.

Must factor the damage cost of extreme weather events and flooding to climate change, which is, at its root, caused by the extract and use energy today. And

Makes intuitive sense: if energy is central to economic activity, we can expect energy use to go up along with economic activity.

Biggest drivers were cheap and abundant sources of energy: coal, crude oil, and natural gas.

## The laws of energy

The first law of thermodynamics states that energy cannot be created or destroyed and that the total amount of energy the universe must remain the same. It can be changed, stored, or moved, but it can’t be created or destroyed. James Prescott Joule (1818-1899) discovered that the transformation of mechanical work (energy) to heat happens in fixed proportions.

The second law of thermodynamics states that energy always moves from higher to lower concentrations.

Most of energy sources are fossil fuels, which are taken from a closed system (our planet), which according to the second law of thermodynamics must create more entropy or disorder as we use them. Take

The energy in oil initially came through plants that absorbed their own energy from the sun through photosynthesis, and through animals that absorbed their energy by feeding on the plants. All of energy originally came from the sun.

Pumped from the ground (requiring energy) and transported (requiring energy) to an oil refinery, where it undergoes a conversion (requiring energy) to gasoline. That gasoline then needs to be transported (requiring energy) to a regional gas station where you fill your car.

Even the most efficient internal combustion engines only convert between 25 and 50 percent : the energy in gasoline into moving the car; up to 75 percent of the energy is emitted as heat and carbon dioxide and : E released into the atmosphere.

A staggering amount of inefficiency –. And drives countless jobs. As the

The size of our populations subsequent energy use meant we couldn’t see the damage the environment as easily as we can today.

Nomic sense. Even if producing much of the that energy was nefficient and wasteful, the energy sources-wood, coal, oil, and natural gas-were abundant and inexpensive.

The cumulative damage from the use inefficient energy is likewise greater. We

Addicted to the jobs and profits derived from exploiting energy-ignoring the fully loaded cost of fossil fuels when we include its by-product, global warming.

Well, we fail to predict how different things will be as energy costs drop to a point where that entire existing energy infrastructure becomes irrelevant because of market pricing.

## 

## Let the sun shine in

By getting our energy directly from the sun instead of a cir cuitous route of digging things up that originally got their energy from the sun and transforming and re-transforming them, we remove an entire supply chain of inefficiency and cost.

In less than two hours, more energy from the sun hits the Earth than the yearly worldwide consumption of energy33

(When we adjust for inflation-convert 1954 dollars to today’s dollars-the drop is equivalent to solar dropping from $2,108.00 $0.82 per watt.) Many Many have compared the advance we’re seeing in solar energy to Moore’s law.

While different than Moore’s law because it relates to manufacturing scale, Swanson’s (named after Richard Swanson, founder of SunPower) states that the price of solar tends to drop 20 percent for every doubling of shipped volume

At present trends of shipped volume, it suggests that costs will fall by 75 percent every ten years.

Unlike other forms of energy that require extensive operating maintenance costs, the cost to maintain solar is low. A typical coal-fired power plant has a large capital cost and a life of about forty years.

Solar installations should extend well beyond forty years, and they are far less expensive to operate.

When comparing energy costs between sources, the most common measure is the levelized cost of energy (LCOE), which allows firms to understand the total cost of energy. Including building and maintenance costs divided by the lifetime of power production.

Levelized cost of utility-grade solar dropped 88 percent in the last ten years. T year alone, prices fell by another 13 percent, bringing LCOE in solar to among the lowest of all energy sources.

As Mark Lewis of BNP Paribas Asset Management wrote, “We conclude that the economics of oil for gasoline diesel vehicles versus wind- and solar-powered EVS are in relentless and irreversible decline, with far-reaching implications for both policymakers and the oil majors 3

Solar is still a very long way away from producing 100 percent of the 153,596 terawatt hours energy needed today, but with lower price on its side, and even lower pricon the horizon, that gap will close quickly

As investment rushes into it, in turn driving more innovation efficiency and further reduction in pricing and storage, the same cycle of creative destruction will drive investment out f coal, oil, and natural gas. In the short term, economies will have the benefit of both the solar infrastructure buildout as well as the other energy sources that are transitioning. But

How much aster China’s ecommerce adoption grew than the United States’ because they didn’t have the existing infrastructure of retail stores to slow it down.

## Changing the price of tomorrow

The paradox of many coastal commu- M nities around the developing world is that even though they are surrounded by water, it is not usable for drinking or irrigation because of its salt content. Desalination-the removal of salt from sea water-is much more efficient today through large-scale use of reverse osmosis

Lower-cost energy completely upends that dynamic, bringing with it clean water and all the other accompanying benefits for societyincluding helping to prevent the environmental conditions can lead to wars and refugee crises.

Carbon dioxide is one of the ways our planet stays warm: like bricks capturing heat from a warm summer’s day and releasing lowly, carbon dioxide in our environment does the same. At

But what if abundant clean energy not only stops adding to that but helps to reverse it? Could the benefit of extraordinarily cheap power allow us remove carbon dioxide from our environment efficiently

It often changes where value is derived, making it so an existing monopoly cannot compete.

Central energy planning ‘ grids may give way to generation that is local and interconnected broadly, in the same way that the Internet is a distributed technology with connected nodes, and this inter onnection makes the Internet more reliable and secure.

Instead of holding onto an inefficient system in order higher prices for energy and keep now-irrelevant jobs will not need the jobs because we can get all the energy required for nearly free.

# 6. The Future of Intelligence

## The impact of artificial intelligence

The solutions we’re putting in place today expecting a coming job boom could create a more dangerous world.

Timeline is important. Maybe general purpose artificial intelligence (where machines are smarter than us at every: thing) is still decades or more away, but it is not if but when it arrives

Artificial intelligence is only the natural next stage in a long trend of growth in information and knowledge, a

That is doubling with the proliferation of technology

## A brief history of intelligence

Without that information and knowledge, most of our limited time would go into providing basic human needs.

Knowledge transmitted orally would lose fidelity over time, memories would fade, and things that were never mentioned would be forever forgotten.

For approximately 300,000 years, our brains have remained largely unchanged¸

By 1500, there were already 20 million books printed, and over the next 100 years, there were estimated to be between 150 million and 200 million books in circulation. This expansion of new ideas and an increasing literacy rate was the start of a revolution in ideas and knowledge. Besides allowing wide distribution, it also encouraged the criticism and debate of ideas.

The ability to do this, over time, developed into the scientific method. Although philosophers such as Aristotle (384-322 BCE) and Ibn al-Haytham (965-1040 CE) had used similar logic to describe the world around them, the process itself wasn’t generally accepted as such until the late nineteenth century.

There is no one inventor of the scientific method. Like science itself, it continued to be refined thanks to the likes of Galileo, Bacon, Descartes, and Newton. The process involves

1. Observation, including rigorous skepticism (to counter our 1) observation, inci
2. formulating a hypothesis; 3
3. making a prediction that can be determined to be true or false; and
4. experiments and testing to determine the validity of the experime

French writer Voltaire observed that “it is dangerous to be right in matters where established men are wrong,&gt;45 but Voltaire and his peers persisted, and the newfound availability and durability of knowledge allowed new ways of being right to spread and prevail

Quote Karl Popper again, “True ignorance is not the absence of knowledge, it’s the refusal to acquire it.”46

Because of the combined ability to both make a permanent record of our knowledge and have our ideas continually questioned and built upon, humanity’s ability to understand world has seemed to change overnight on the evolutionary scale\_

Like the exponential effect of pennies doubling or grains of rice on a chessboard, extending our brains to books and refining and extending ideas that came before us allowed our knowledge to increase exponentially. At first, it was seem knowledge to increase exponentially. At first, it was seemingly slow and small, a metaphorical trickle of information. Now there is a flood of information and knowledge that is hard to comprehend and keep up with.

## The beginning of Al

Babbage later used the knowledge he gained while designing the difference engine to prototype his analytics engine. It was the first design of a general purpose computer, with many of the functions that computers have, including separate storage and central! Processing, and areas for inputting and outputting data and i instructions. He He was a long way ahead of his time and, again, ས instructions. He was a long waver completed during his 1

Claude Shannon (1916-2001) was breaking barriers enabled many of the advances in computers and artificial intelligence that we now take for granted. Shannon was an American mathematician and one of the main architects of American mathematic

He changed the way we think about information.

Interested in how to transmit information in its simplest form and realized that to do so, information must not be confused with meaning.

Shannon, “These semantic aspects of communication are irrelevant to the engineering problem. The significant aspect is that the actual message is one selected from a set of possible 9948

Doing so, he invented a unit of measure for the receiver. By doing so, he inve tion cuts the number of possibilities in half for the receiver.

Measuring information and its growth became easy as measuring anything else, and information processing, storage, and retrieval were born.

Organize like computers, then computers can learn like brains. But was Turing right? Do we understand by reducing probabilities

Psychology suggests that the answer is yes, our brains do act Bayesian probability machines, constantly making new predictions based on changing information from our senses and assigning probabilities to the outcomes.

Similarly. A computer could solve any problem if it had a prior probability and enough compute power to continually adjust that probability in other words, error correction and refinement 1 of hypothesis through iterations. Intelligence.

It was the first time that ann was ever said to be creative, a domain always thought to be owned solely by humans. Just one year later, in 2017, Google launched a newer version called AlphaGo Zero that beat AlphaGo 100 games to zero.

Cessor, It also didn’t require any Zero became its own teacher, playing itself millions of times and through deep reinforcement learning getting stronger each game - No lon!

Took only three days of the computer playing itself to best previous AlphaGo versions developed by

# 7. Who Will Be the Masters?

Why were certain people willing to commit to practicing enough to attain mastery? Gladwell found that, in many cases, it was because of a simple human bias. They were better at it early, sometimes only because of when their birthdate fell in the calendar, making them the better part of a year older than other kids in their

Repetitive practice in the brain solidifies connections at the expense of other connections. It not that new information and new things cannot be learned, without lattice in the brain to connect to-previous recognized patterns-learning anything completely difficult.

Repetition and error correcting. And that becomes the trap-when new thinking is needed, it is very easy for us to remain entrenched.

## The power of technology

Enough data or rules of a game, exactly as received. V 615550 each other, instead of a seeing only the small sampling that a : human can. But what seems like superhuman intelligence is just pattern recognition and error correction at scale, without shortcuts humans need to compensate for efficiency. With : enough data and compute power, a computer can play billions’ of simulations concurrently and learn from every one of them, all without forgetting mistakes made in previous games.

## What’s coming

Our own specialized knowledge is what we are paid for in our careers, with top dollars going to the “best” or “experts” in specialized domains.

## The body digitized

These new platforms in health are likely to be monopolies the others we see today for the same reasons. The benefit to users is too big to ignore and the consolidation of information makes the benefit increasingly better.

Again, like free search on Google, the network effects and data advantage will provide benefits that are incredible for society

Yourself: Would you choose the cheaper, more effective or your family’s health was on the line?

## The Al race

Hey creating data monopolies where vast data sets are being combined to produce impressive results.

Is no secret that Huawei has ambitions to build an infrastructure backbone to capture data flows. Own tagline, “Building a fully connected, intelligent world,” captures it succinctly.

Ben Goertzel and many others want a different future for AI. Ben believes that there is high risk if Al is controlled by a corporation or government.

Has long advocated that artificial general intelligences have the potential to be massively more ethical and compassionate than humans. But still, the odds of getting deeply beneficial AGIS seem higher if the humans eating them are fuller of compassion and positive consciousness.

But although these open initiatives are laudable, what hurts many of them is the lack of data and data velocity, which inhibits the learning rate. Core

# 8. Us versus Them

## Belonging-and exclusion

See this dynamic playing out across our lives sometimes even in our most important relationships. It is not isolated to eleven- and twelve-year-old boys. Ironically, because of our strong desire to belong, it is easy to divide us. Maybe, though, the Robbers Cave experiment shows us a path forward where, through the right incentives or world challenges, we can do better.

## The power of understanding needs and desires

Advertising and marketing deliberately play on our desires and biases to guide our thoughts.

In his seminal book Actionable Gamification, Yu-kai Chou proposes a framework called Octalysis. In that framework, Yu-kai believes that there are eight motivational forces that drive every action we take-not just in games, but founda tional to everything.

What mechanisms in game design create habits and keep us coming back? For example, if a game is too difficult to win early, users get frustrated and do not stick with it, so game designers include early wins or prizes to create dopamine responses in your brains, which create stickiness. As the

Giving ownership of prizes that be used to get through harder levels, game designers cre ate a ladder of motivators to keep your brain engaged.

We know that our thoughts and actions are highly influenced by what we see, read, and listen to, so that means that the technology that targets us naturally creates filter bubbles.

We rarely look outside J. our own bubble of reality; and when we do, the people in other filter bubbles look downright crazy- It could be religion, politics, economics, race, or any number of other divisions.

## The rise of extremism

People do not naturally hate others when they’re content or have abundance. They are manipulated into it when they feel discounted or that they have nothing to lose.

In 1914 was equal to 4 German marks; by 1923, the same dollar was worth 4.2 trillion German marks.

Psychologist Stanley Milgram (1933-1984) in the 1960s, attempted to measure our obedience to authority figures.

Experiments showed that what we think we will do is different from what we actually will do.

Milgram later wrote, “Ordinary people, simply doing their and without any particular hostility on their part, can become agents in a terrible destructive process. Moreover, when the destructive effects of their work become patently clear, and they are asked to carry out actions incompatible with fundamental standards of morality, relatively few people have the resources needed to resist authority.

In a world where abundance is possible, it is a flawed system that gives rise to extreme inequality.

# 9. Can We Cooperate?

The entire global warming dialogue could be put into this scope as some countries worry that the economic impact of becoming carbon-free too quickly will hurt their economies (by making their energy more expensive relative to others).

How we play the game, in theory

We assign probabilities to outcomes based on how others will play: Due to this, in a game where everyone cooperates, very often, an incentive accrues to the person who “betrays” or “cheats.” “

That creates risk, either perceived or real, for any country not investing in its military. This in turn forces other countries to spend on milito gain parity or create a deterrent to attack, especially if deemed superior power signals its intent to invade.

Game theory and its implications apply to many of our most contentious societal debates, all arising from the same core issue: in group dynamics, what might be better for one person often is worse for the group. This is why gun control, global warming, currency manipulation, global trade and tariffs, or the race for artificial intelligence superiority become such thorny issues.

We rarely play a game just once

You are likely to change your strategy

Different strategies gives a better view into the complexity of relationships and various strategies that drive cooperation and trust.

## Play it again, and again

This strategy seemed to win against most other strategies. Survival, it seems, at least in a computer simulation, enhanced by cooperation.

The prize for all inhabitants would be a world of peace and love. Weapons and cost of those weapons would no longer be needed. But if a world like that existed, the prize to the power hungry for betrayal would be much higher: a case would be where one country secretly amasses weapons to easily invade and take over all countries because those inhabitants would be unable to defend themselves. And because of that increased payoff, betrayal becomes more likely.

Strategies are therefore in continual flux. A strategy like cooperation wins until such time as it becomes dominant. Then it is exploited by a selfish or defecting strategy to win for a time by taking advantage of the dominant strategy. At times, even though it feels unjust, the cheaters win.

Rise of fiat currencies that could be manipulated domestically and the bailout in 2008 changed that strategy to one where the players whose bad bets caused the crisis, instead of being wiped out, were rewarded handsomely.

## The new rules

Most important elements of our human “games” at their core are about chasing scarce or finite resources-for example, historically, winning an economic advantage in energy came down to scarcity of low-cost fossil fuels.

With abundance comes price deflation. This is simple supply-and-demand economics: the more abundant something is, the more likely it is that its price falls.

In a world where technology is concurrently driving deflation and abundance, maybe eventually, one of the forcing functions that makes cooperation more likely to stick is the very fact that there will not be a large economic incentive to “cheat” or “betray”-abundance minimizes the payoff. Or maybe we should attempt to create an economic system that works that way.

# 10. A Call to Action

Ismail didn’t say that the older institutions necessarily would fail. But he told us that it is a exception in history when a monopoly company of the past does what is necessary to stay relevant in the future.

The average thirty-three-year tenure of companies on the S&amp;P 500 list is forecasted to shrink to just twelve years by 2027 due to technology. It makes sense-transition requires long-term thinking.

It requires going against the grain of where the current market and profits are. Bets on the future are invariably big bets against where the market is today

The data is clear in companies, what the cost of not investing in the future is death, but what about some of our biggest institutions that we do not allow to fail? Specifically the ones like education, healthcare, government.

But, really, it is not “them.” The same thing that allows best and brightest companies to become irrelevant exists every one of us. Whether it is sunk-cost bias , confirmation bias, or a host of other biases.

That pattern recognition us into a path that makes us blind to signposts that don’t match our view of the world. Information growth and the rate of change will only accelerate from here, and in a world that changing so fast, it is not reasonable to expect those in government to be any less vulnerable than we are-even if they set the rules.

It is not that there isn’t conversation. All over the world measures are being explored to try to deal with the problem of rising inequality. But the solutions proposed so far only serve to drive further division, because they fail to recognize the primary reason for that rise in inequality: Economic dogma gives us a false choice from frameworks built for a time before technology, when the world operated differently. Not seeing any other option, we lock into one economic framework or another and defend our position at all costs. And as positions becomes entrenched, we become blind to potential solutions that could save us, just like Kodak missing the digital camera.

Four ways to escape the debt burden:

1. Austerity-spending less 2. Debt defaults/restructuring 3. The central bank printing money or other guarantees 4. Transfers of money from those who have more than they need to those who have less (much higher taxes for the rich)

Create a vicious feedback cycle and a collapse in asset prices, combined with lower employment that would result in debt defaults or restructuring.

Paradoxically, the debt in the world is already so high that not just austerity that would set off an unwind of asset rices and vicious feedback cycle. Slowing growth alone could set off this chain reaction, since the debt becomes unserviceable without fast-enough growth.

Camps on opposing sides of the political | spectrum: on one side, those that use lever 3, and on the other

Continued low or negative interest rate environment, central bank printing, modern monetary theory, or guarantees to keep the party going

Greatest irony of this camp is that it has the highest belief in a free-market economy and capitalism but at the same time doesn’t realize that free-market capitalism is not what is happening today.

Keep the party going by driving more debt. It

Short term while pushing more pain in the longer term.

People feel richer-that is, until the bill is due.

This solution, in the end, is a dissolution.

Require wealth transfers

Argument from those who have wealth is that the higher the rate on the wealthy, the more disincentive there is to take risks, innovate, and be a strong contributor to society

The idea is hardly new; various proposals date back hundreds of years In theory, it sounds reasonable. Even for the ardent capitalist, it could be self-serving. Capitalism

Job losses and income inequality will reduce the number of people who can participate in the economy.

Even though universal basic income sounds radical to some, it is at least an alternative to that outcome:

Complexity in determining the right wage. How would government differentiate wages by needs-choosing to live in one city versus another, for

What about people with disabilities or dependents?

The higher the subsidy, the high the tax on the wealthy, turn creating a powder keg of division with each side believing they are being taken advantage of.

Effect on jobs will accelerate globally. BY

## Who’s controlling the money?

Similar resets have happened in the past.There

Setting monetary policy and controlling the underlying value of money, giving it power to

Money can lead to abuse of power-¢

Domestic issues always take precedent over international ones, which means a system that is controlled by one nation and is the backbone of all other currencies might work for a time-until the country’s domestic issues force it to unilaterally deliver economic benefit to the nation in control of the currency while hurting all others.

Hell breaks loose because international cooperation is lost.

Vowing not to repeat those mistakes that led to mass unemployment, authoritarianism, and World War II, leaders of the world came together in 1944 to establish Bretton Woods-a framework for global cooperation

N international monetary system where all countries tied exchange rates to the price of gold and the us dollar; US dollar became the primary currency of the world and the Us dollar was tied to gold through a fixed exchange rate.

Allowed global trade to expand and increased global prosperity

But in 1971, the United States unilaterally terminated a critical aspect of the system-the conversion of the US dollar to gold-and with change created a system where the us dollar, a fiat currency subject to domestic agenda, the backbone of the

Without a peg to gold, it gave the us tremendous fluence in global affairs. It also enabled a single country to change the rules by printing more currency, and therefore set stage to return to where we are now, where each country manipulates its currency for political gain while worsening a framework for fair trade.

Of their currency relative to others. Bitcoin attempts to change that dynamic by forever fixing supply at twenty one million Bitcoins. In

In addition to that, it creates a peer-to-peer ledger without any central control: the blockchain. As open, distributed ledger, it offers security and trust by verifying transactions with consensus instead of through a central authority.

Some parts of the world have less risk in holding Bitcoin than their own currency. The

Volatility must be put in context. The

## The simple solution

Occam’s razor: a simpler solution is more likely to be correct than a complex one.

Complexity makes us prone to error. As the number of assumptions in coming up with a hypothesis increases, the chances increase that one or more of those assumptions are wrong.

Deflation becomes something celebrated because it means that we are getting more for less. We allow because it means that we -¢

Technology removes jobs and fewer overall jobs are needed, prices will keep falling, allowing those who lose jobs a way to share in the benefit of technology abundance without mastransfers of wealth. If tech

If technology-driven price declines continue to the point of something becoming free, we let that happen, too.

Is hard to imagine this because we have grown up in a world where these choices did not exist.

It is easy to dismiss it out of hand, because we are trapped in a system where we don’t know what we would do with selves if we didn’t have jobs.

Relationships and social status (our “us”) often coming from jobs.

The fear of a future without those jobs self-worth that they bring stops us from imagining a betworld in which they might not even be required.

Jobs might actually open an entirely new enlightenment era where we have time to enjoy the benefits that technology brings.

Deflationary aspect of technology is too great a force and it will eventually overwhelm even the greatest efforts to stop it.

Those efforts to stop it, and the second-order consequences that fight to halt deflation, will look insane to future gen:rations because that fight will bring on revolutions and wars burn the existing system to the ground. Allowing that to happen seems insanely irresponsible, since humanity might forever lose the opportunity to have the kind of social uplift that is possible with technology

A coordinated effort internationally: since with trade, one country alone taking this action would be at a disadvantage to her countries still manipulating their currencies. As more users trust the system, more trust accretes to the system.

What starts as a way for citizens in Venezuela and other regions of the world to escape crushing currency devaluation could jump from country to country and easily build to point where it becomes the de facto standard of trust.

Something must be done. But because the issues are so complex and thorny in nature, it is easy to put heads in the sand and hope others will solve them.

Increasingly worried about world conflict if we don’t act.

Wrote this book to get us all talking and thinking-and the big questions.

Crowdsourced competitions have been used to develop breakthroughs in everything from healthcare, to creating better algorithms to find dark matter, to cleaning our oceans. One of the key attributes of crowdsourcing is that it is open to participation; it allows ideas and contribution to come from anywhere and anyone.

# Notes