

A Radically Beneficial World: Automation, Technology and Creating Jobs for All

The Future Belongs to Work That Is Meaningful

Introduction

Up until recently, millions of us have prospered in ways previous generations only dreamed about. I'm not referring to owning mansions, yachts or buying political power — I mean *leading a self-directed life and owning the sources of our prosperity*.

This autonomy and ownership is known as *The American Dream*: the building of lasting value by doing work you care about, on your own terms.

We achieved this prosperity without the advantages of an Ivy League education or an inheritance. In other words, widespread prosperity flowed not from privilege or genius or luck, but from plentiful opportunities.

The system itself provided these opportunities. Millions of us stepped forward and seized them.

Fast-forward to today and times have changed: the opportunities of the recent past are distant memories. We all sense this, but don't know how to fix this new poverty of opportunity—to not just get ahead, but to *own* your work.

Defenders of the current order claim this decline is temporary, and modest reforms can fix whatever's broken.

But their denial doesn't change the reality that wages/salaries have been stagnating for decades while wealth/income inequality has soared. I won't bore you with the statistics, but anyone who looks at labor's share of the economy, earned income adjusted for inflation, or yardsticks of inequality realizes this isn't a temporary rough patch: the system itself is broken.

Even the defenders don't deny the global impact of automation on human labor, or the increasing demands on the Earth's resources as more than 7 billion people strive for middle-class consumption of food, energy, shelter and transport.

Optimists claim solar-powered electricity will soon be essentially free for everyone, but this doesn't mean that oceans stripped of sea life will magically be restored, or the forests cut to grow animal feed can be replaced with artificial trees. Refusing to recognize planetary limits doesn't make them go away.

Automation—software, robotics and artificial intelligence—is rapidly replacing human labor everywhere—and not just low-skilled work. As tech visionary Marc Andreessen famously noted, software is “eating the world.” More to the point, software is eating paid work in greater and greater gulps every day.

This destruction of work will lead to a work-free Utopia, we're told, paid for by taxes on the owners of software and robots. But if we do the math—which we do in Chapter One—we discover this is absolutely baseless nonsense, the worst sort of magical thinking. Not a single wishful-thinker proclaiming the wonders of a guaranteed income for all in a work-free society has offered even a crayon sketch of where the money will come from using real-world sources such as corporate profits and federal tax revenues.

When it comes to understanding our socio-economic system, we're like fish in the sea: we cannot imagine any other system than the one we inhabit. We assume it's not just *the only*

system, but that it's *the best system*: whatever its flaws might be, it has worked well in the past and it will work well in the future.

This is demonstrably false. Rather than being perfected over hundreds of years, our system is a junk heap of history: bits and pieces that happened to survive plagues, wars and revolutions. If we look at it with fresh eyes, this junk heap makes no sense whatsoever. It wasn't planned to be coherent, so no wonder it's incoherent. How could it not be?

The current system is based on five principles we assume are like socio-economic gravity, i.e. they're self-evidently true:

- Money created by banks trickles down to create work and wealth for all
- Technology always creates more jobs than automation destroys
- Centralization is the solution to large-scale economic problems
- Expanding debt and consumption (i.e. growth) is the path to prosperity
- Maximizing private gain organizes the economy to the benefit of all

If we look at these statements with fresh eyes, we realize they're all just wishful thinking. All five have proven to be untrue. Rather than being the foundation of a coherent system, each one adds more incoherence. Instead of serving as a solution, each one is a toxic problem that further erodes the system from within.

What does this system failure mean for us as individuals and households? For starters, anyone who wants a better future for themselves and their family needs to start taking charge of their destiny like never before.

But working within the failing system to better our individual destinies is no longer enough. Even the few who can afford to buy island fortresses will soon discover we share the consequences of the current system's failures. Once the seas are stripped of wildlife, they're stripped for everybody, not just the poor.

The real solution is obvious, isn't it? We need a new system. We all sense this, but don't know where to start. Let's begin with a simple question: *What if we could hit the reset button on the ways we create money, work, commerce and community?* If we could start from scratch, what would we build? This is not an idle question, for technology now enables us to hit that reset button and organize the creation of money, work, commerce and community in new ways.

If we set out to create a system that offers everyone the opportunity to control their own sources of prosperity, what would such a system look like?

If that's a question that interests you (and if it doesn't interest all of us, we're in real trouble), read on. This book lays out a complete, comprehensive global system-solution.

Its key is no secret: it is to understand *how systems work*.

Systems have inputs, rules and outputs. If we eat only jelly beans and never exercise, we become unhealthy because our bodies are a system:

Jelly beans + No Exercise = Poor Health and then Death

Simple!

In a similar way, our current economic/social/political system yields failing economic/social/political results.

To paraphrase a popular definition of insanity: “Insanity is feeding in the same inputs and expecting different results.” Changing the flavors of the jelly beans and shifting positions on the sofa aren’t going to change the end results (death).

Yet all the reforms that have been proposed so far are *exactly like changing the flavor of the jelly beans* and expecting this minor change to result in a fundamental improvement in our health.

We need an entirely new system if we want to change the output from inequality, insecurity and poverty to opportunity, secure work and prosperity.

This new system doesn’t require overthrowing the existing order, or fixing the current system. This new system unifies existing technologies and social innovations that we can all understand. This new system is not utopian; it’s extremely practical. We see examples of similar systems every day.

We don’t want to keep failing by changing the flavor of our jelly beans and wondering why the results don’t change. Change the system, and the outputs will become:

- opportunity
- autonomy
- secure work
- ownership of the sources of prosperity.

There is one planet-changing difference between our current system and the one described here. The current order is top-down, and to change anything, you need wealth and/or political power (if you have the wealth, you can buy the power). The individual is essentially powerless in this system; votes are counted but the top-down power structure remains unchanged.

In the system described in the pages to come, *every individual has the power to change the system for the betterment of themselves and every other participant*. Being at the top of the heap is no longer a prerequisite. Everyone who is powerless in the current arrangement is empowered in this new system. Empowered to not just better themselves and their family, but to better their community and through that organization, the larger community of Planet Earth.

My book embraces this global challenge in a great big bear-hug that snaps the shackles of ideological jargon and frees us to map a practical route to a radically beneficial future. What are we waiting for?

Section 1: Why the Current System Has Failed

Chapter One: Gaping Holes in the Conventional Narrative

This book—originally titled *Bridging a Treacherous River: New Tools to Solve Global Poverty*—started as a blueprint for alleviating global poverty. It was the culmination of my 40 years of pondering these simple questions: Is poverty inevitable? If not, what is the systemic solution that would alleviate poverty everywhere on the globe?

As a practical person by nature and training, I sought a practical answer.

I found we have two kinds of poverty: the age-old kind (scarcity) and a new kind driven by automation and software that is “eating the world,” in Marc Andreessen’s arresting phrase. Digital technologies are replacing human workers on a mass scale, threatening millions with a loss of income.

People who lose their livelihoods become poor not only in a financial sense, but also in purpose. The poverty extends far beyond their bank account into every aspect of their lives. A systemic solution to poverty has to solve both kinds of poverty.

Once the core cause of poverty is understood—a lack of secure paid work for all—I realized my real subject was *creating jobs for everyone who wanted paid work* - on a global scale. This was the solution not just for global poverty, but for automation’s accelerating replacement of human labor.

In figuring out why *the only possible output of the current system is poverty and inequality*, I came to understand a few other things that will help us design a new system that outputs opportunity for all.

One is that state-capitalism (or whatever you want to label the current arrangement) is more than an economic or financial system; it organizes our relationships to Nature and other people, and does so without our really being aware of it.

In other words, a financial-economic system is also a social-political-resource-management system *by its very nature*. The design of the financial-money-economic system sets the course of everything else.

Secondly, the key to any financial-economic system is *value creation*. If a small group of people control the creation of value, the only possible output of the system is a poverty of opportunity and rising inequality—precisely what the current system yields.

By definition, money has value. Those who control the creation and distribution of value (i.e. money) control everything else downstream. If you don’t change the way money is created and distributed, you haven’t really changed anything. You’re just eating a different color of jelly bean.

Let’s say a system recognizes jelly beans as money. I own the only jelly bean factory and imprison everyone who tries to set up a competing jelly bean factory. Who do you think will be wealthy and powerful in this system? What is the only possible output of this system?

This is a simplification, of course, but you get the point. Those who control the creation of value control everything else. If we don’t change the way money is created and distributed, nothing changes. We’re just changing the color of jelly beans and wondering why the results don’t change.

Opportunity boils down to *opportunity to create value*. If value creation is controlled by the few at the top of the heap, the many will lack opportunity. There is no other possible output of such a system.

We’re all for freedom, of course. Only despots and dictators are against freedom. But freedom without opportunity to create value is illusory. What precisely does freedom mean in a system where value creation and opportunity are limited to the few at the expense of the many?

Chairman Mao famously claimed that “political power grows out of the barrel of a gun.” The power of coercion grows out of the barrel of a gun, but that’s not the same thing as political power, or the power to get things done.

It turns out Chairman Mao was wrong. *Cooperation is the basis of power.* The fellow in the jaunty Mao cap with the gun can only hold whatever power grows out of the gun barrel as long as he is pointing the gun at those with no guns. Coercion is a very limited form of power. Coercion doesn’t create value, *cooperation creates value.*

We can only value what we measure. If we don’t measure it, it doesn’t exist. When we talk about inequality, we end up talking about money, because we can measure money. The end result of measuring inequality with money is the idea that if we give people a bit more money, inequality diminishes.

But inequality isn’t really about money. Inequality is about who controls value creation and who has the opportunity to create value. Giving people money assuages the guilt of those at the top of the heap, but that’s not actually changing the inequality of the system. It may buy the silence of those deprived of opportunity, but it doesn’t change the sources of inequality.

Since we don’t measure the sources of inequality, we don’t even recognize them. If we deprive a person of the opportunity to create value, to actively contribute to something positive and important, but reckon a handout of money will make inequality go away, we’re blind to the sources of inequality.

The first step is to recognize that money is not the only or even the most useful measure of inequality or value. It’s not even an adequate measure of *capital*, because the most valuable capital is the opportunity to create value by freely cooperating with others.

The current system is a centralized hierarchy. Centralized hierarchies work great for those at the top of the wealth/ power/ security/ opportunity pyramid. The top 10% with most of the wealth, power, security and opportunity look down and declare that since the system works for them, it works for everyone. They gaze at the few who clamber up the pyramid to join their ranks as proof the system works for everyone with the right stuff: smarts, dedication, and so on.

Needless to say, these same people hold the wealth and power, so they’re not about to let anyone else change the system lest they lose their spot on the top of the pyramid. Since they’re smart, dedicated, etc., they can easily conjure up a limitless list of reasons why the system is sound and needs only modest reforms.

But whether the top 10% recognize it or not, or like it or not, the system is unjust. It is morally rotten to the core. Any system in which *the only possible output is poverty of opportunity and inequality* is rotten to the core.

But the system’s moral corruption isn’t the most pressing problem. The truly pressing problem is the five dictates listed in the introduction are eroding the system from within. The more we pursue these five dictates, the more we hollow out the system from within.

This leaves us with a choice. We can defend the rightness of the system that works for us as individuals, enabling us to maximize our private gains. We can eat different colored jelly beans and hope the system will magically save itself, or we can grasp the nettle and design a new system from the ground up that yields opportunity for all.

We’re told there is always middle ground, but that’s not always true. Sometimes it’s either/or.

Going forward, let’s focus on this truth: *a system that works for everyone works for us, too.*

Why Do We Reject New Solutions?

Our first reaction to any new solution is generally skepticism. There is more to this than just healthy *buyer beware* caution, and we need to understand the psychology of skepticism if we want to avoid falling into the trap of naysaying.

Skepticism is part of our intellectual immune system, protecting us from wishful thinking, fuzzy logic and the illusion of understanding (i.e. the urge to distill everything into a Power Point presentation).

But skepticism is also a cover for naysaying. Under the guise of skepticism, naysayers find ample fault with the present arrangement but even more in proposed solutions. When naysayers rule, the system stagnates. In companies, stagnation leads to bankruptcy. In societies, stagnation leads to a decline in vitality and the ability to solve problems.

Naysayers feel they're performing a valuable, even heroic duty in shooting down solutions. Thanks to their efforts, foolish people who might otherwise take unwarranted risks are saved from themselves.

That the naysayers themselves pose the greatest risk does not occur to them. Yet this is the reality. Nassim Taleb and others have shown that systems that resist the ferment of new solutions become increasingly brittle and fragile. Rejecting solutions guarantees systemic collapse.

One powerful reason we naysay is to protect our pay, perquisites, position and social standing from the threat posed by new solutions. Experimentation and competition are threats to vested interests, and we all understand the motivation to protect our share of the pie from the threat posed by *faster, better, cheaper*.

The common good is served not by self-serving vested interests but by *faster, better, cheaper*. If experimentation and competition are suppressed to protect vested interests, the system rots from within.

Naysaying triumphs when self-interest trumps the common good. Unsurprisingly, this depreciation of civic virtue in favor of self-interest—*maximizing personal gain* by whatever means are available—has been identified as a core cause of Rome's decline and fall.

Naysayers tend to find homes in Naysaying Organizations (NO) such as bureaucracies and monopolies—organizations that either exist to say no (bureaucracies) or that depend on the elimination of new solutions (also known as competition).

It's not accidental that Naysaying Organizations are centralized hierarchies. As we shall see Chapter Two, systems self-destruct when they get big, complex, centralized and hierarchical. How they self-destruct is simple: innovation, experimentation, competition are stifled as threats, and so *faster, better, cheaper* is safely buried in a shallow grave.

The way to get ahead in these organizations is to excel in naysaying—but do so while proclaiming your undying support of innovation. Innovation is fine as a principle, of course, but once it threatens vested interests, which ahem, it always does, it's quickly sent to the *further study is needed* graveyard.

Naysayers display their expertise not by innovating but by poking holes in others' innovations. Innovating is risky, naysaying is safe—especially in organizations that avoid risk. As a result, naysayers are praised by colleagues for protecting the organization from the threat of innovation.

There's another powerful motivation for naysaying. Those in the top 10%—the technocrat/financial layer of the economy—look at their own success and think, *the system works for me and my colleagues, so it's*

obviously working great. The possibility that the system only works for the top 10%, or that this success is only temporary, is less persuasive than the personal experience of those within Naysaying Organizations.

In other words, when the system isn't working for you personally, you have little motivation to naysay. You're interested in solutions and are willing to give them a chance. But those safely protected by vested interests have many motivations to naysay and few reasons to support potentially disruptive solutions.

By all means, let's be skeptical, but let's also avoid the naysaying slide to stagnation and collapse.

My Personal Journey to the Solution

This book follows philosopher Ludwig Wittgenstein's memorable advice: "Don't get involved in partial problems, but always take flight to where there is a free view over the whole single great problem, even if this view is still not a clear one."

To my surprise, my own circuitous career path helped me identify the gaping holes in the conventional narratives and map out a new solution.

Here's a rough sketch of my career jumble: carpenter/builder, entrepreneur, employer, political activist, community volunteer, co-founder of a local non-profit, backroom manager of a small financial research company, and, more recently, self-employed author and writer in the digital marketplace of books, blogs and ideas. I've built a lot of houses and written a lot of books, and pickaxed an independent livelihood out of the trenches of the risk economy.

Steve Jobs gave a commencement speech at Stanford University in 2005 that's famous for its hard-won wisdom on the way our career dots only connect when we reach the point where it all comes together.

This book is that point.

Each of my work experiences contributed something to the dot-connecting that is irreplaceable. I would not have the same analytic tools in hand if even one of these were missing.

It's only fair to warn you that while learning carpentry as a young man I also earned a degree in philosophy. This means I occasionally have an irresistible urge to use an obscure word like *teleology*. I'm not trying to be obscure, I'm trying to be concise; sometimes a single word corrals a whole slew of important ideas.

Teleology is one such word. It means the end-goal, the end-point to which all the things we've done—successes *and failures*—were leading us.

There's teleology in our lives and in systems. What we'll be exploring in this book is how systems lead to specific end-points *by the nature of their design*.

Understanding abstractions is essential but insufficient. It's not enough to have abstract knowledge; you must combine it with boots-on-the-ground experience to understand how things really work.

There's one other essential ingredient: *risk*.

You can never really understand how things work unless you have skin in the game, and having skin in the game introduces risk. Losing, failing, being rejected, not getting paid—these focus our minds. There is no substitute for what we learn by grinding through real-world problems and facing the consequences.

Put abstract knowledge together with real-world knowledge, and if we're lucky, we develop an ability to think independently, to ask questions and come up with answers that aren't just snatched from accepted-wisdom narratives.

What's Easy but Guaranteed to Fail: Wishful Thinking

We all know that humans like things to be easy. We're designed that way for a reason. Calories are scarce in the hunter-gatherer world, and spending precious energy on difficult tasks has no pay off unless the rewards are outsized. (Recall that our brains are fierce furnaces that burn lots of calories.)

This is why we prefer wishful thinking to analysis. Wishful thinking is a lot less work. If given a choice, we'll opt for wishful thinking, as it's generally less risky than gambling precious energy on work that might not have a payoff.

But if we face difficult problems, wishful thinking isn't very useful because it doesn't generate solutions. Wishful thinking satisfies our preference for ease, but it doesn't solve problems.

If you're running a real enterprise, i.e. one that will bankrupt you if you fail to solve problems, wishful thinking is catastrophic. There are few guarantees in life, but wishful thinking guarantees failure.

Wishful thinking cannot replace the hard work of analysis, experimentation, and all the risky flailing of problem-solving.

So if we want to actually solve the problems of poverty and automation eating at our world, let's grit our teeth and perform some painfully calorie-gorging analysis. The results will be worth it.

Three Starting Points

Before we can start designing a new system, we first need to understand why the current system has failed. Otherwise, we may end up with the same result. Let's start with these three points:

1. The conventional narrative of our socio-economic system is so full of holes it no longer makes sense.
2. We're not asking the right questions - the ones that really need to be asked.
3. Systems are not ideological. They function independently of our wishes and cannot be fixed by mental or emotional trickery.

Though we're supposedly taught to think critically, amazingly little independent thinking is actually applied to the five narratives listed in the Introduction. Why is this so? There are several reasons.

If these narratives no longer make sense, we have to generate new ones. That is an inherently risky project, as the new narratives might be as incoherent as the current ones.

Though we really have no choice—the existing narratives make no sense, whether we like it or not—we avoid questioning the status quo because asking questions requires us to accept that the future is in doubt, and that uncertainty generates anxiety.

Another reason we don't ask the questions that need to be asked is a *failure of imagination*: few can imagine a world much different from the system we currently inhabit.

The idea that systems exist independent of ideology was sparked by a Donella Meadows essay, *Leverage Points: Places to Intervene in a System* (you can read it on donellameadows.org).

Prior to reading this essay, I accepted the conventional narrative that economic and social systems were ideological: capitalism, Marxism, democracy, socialism, and so on. People believed in the system or rejected it for ideological reasons.

That systems can be broken down into inputs, rules and outputs that have nothing to do with our beliefs about their goodness or efficacy was a revelation. Simply put, systems succeed or fail independently of our ideological convictions about the system.

Though the psychology of beliefs is complicated, it boils down to identity: our belief in a system's value is core to our identity.

We believe in the goodness and rightness of subsidized housing, for example, because we believe in social justice and housing for all. That it doesn't help low-income people is counter-intuitive and unacceptable: it must help low-income people because we want to help low-income people.

Similarly, we believe that maximizing private gain guides the system to prosperity because we believe in economic freedom. How could anyone not see the goodness and rightness of economic freedom? That maximizing private gain destroys the system is counter-intuitive and unacceptable: maximizing private gain must make the system function properly because self-interest is the core of liberty.

And so on. Every ideological belief can be broken down in this fashion.

We resist this analysis because it challenges our identity. No wonder we resist: what is more core to our sense of self than the beliefs that anchor our identity?

Once we understand this, we can separate our beliefs from systems. We can maintain our beliefs but understand that the system's success or failure has nothing to do with our convictions.

If we want positive output, we must examine the system as a system, not as an expression of our identity and beliefs.

Strangely, we insist on supporting systems whose outputs are precisely opposite to what we profess because we feel that an uncritical belief is an expression of our conviction.

That leaves us with a stark choice. We either set a goal of designing a system that produces a positive output, or we indulge our ideological beliefs. It's one or the other.

As Meadows points out, systems are often counter-intuitive: we intend them to yield a specific output, but the rules and inputs we choose may yield a completely different output than we expected. Add in a failure to imagine a world different from the one we inhabit, and it's no wonder our systems are self-destructing.

The first section of this book has three goals:

1. Examine the gaping holes in the conventional narrative that render it incoherent
2. Ask the questions that need to be asked but aren't being asked
3. Understand our economy/society as a system

Once we've accomplished these goals, we will be ready to design a system that actually produces a positive output.

Automation, Jobs and Guaranteed Income

In researching what others have proposed as solutions to automation, I was astonished to find gaping holes in the conventional narrative of what happens as software and robots replace vast swaths of human labor. The conventional narrative (as presented by highly regarded economists, academics, journalists and public intellectuals) is that automation's inevitable erosion of jobs will result in either:

- The creation of even more jobs than those lost to advancing technology; or
- A guaranteed minimum income for all, funded by taxes on those who own the robots and software that ate all the jobs.

In other words, *we don't need to change the inputs or the system*: the system will solve the wholesale destruction of jobs without us having to do anything different. It will automatically create more jobs than it destroys, and the state will collect more taxes and pay everyone a minimum income.

That each of these conclusions is incoherent and impractical is clear to anyone with entrepreneurial experience and a basic grasp of government spending and corporate profits.

Let's start with the idea that technology will always create more jobs than it destroys.

There is little evidence that this is still true. It may have been true in the past, but not now.

When asked to name one technology that has created more jobs than it destroyed in the past decade, the typical answer is biotechnology. But what few seem to recall is that the chemistry-based pharmaceutical industry was gutted by the rise of the bio-based pharmaceuticals; thousands of jobs were lost. The stunning lack of profitability of the vast majority of biotechs is also not mentioned; nor is the surplus of workers trained in science, technology, engineering and math (STEM).

Issuing more STEM degrees doesn't create jobs for the graduates.

This faith that technology will magically create more jobs than it destroys is wishful thinking. This theology arose as a result of the transition from low-skill agricultural labor to low-skill factory labor in the First Industrial Revolution (1750 – 1860, steam, railways, factories, etc.) and the Second Industrial Revolution (1870-1930) (mass production, electric lights, autos, aircraft, radio, telephones, movies). Each transition offered millions of new low-skill jobs to those displaced by technology and created increasing numbers of higher-skill jobs in design, technology, marketing and management. But history is not repeating itself in the latest Industrial revolution.

The Third Industrial Revolution

This latest revolution began with digital communications and data-processing, and has lately witnessed rapid advances in robotics, software and networked digital devices, i.e. the World Wide Web and the Internet of Things.

For the first time in the progression of technology, there are no low-skill jobs being created by the latest revolution. Not only are there few low-skill jobs created by the digital revolution, existing high-skill jobs are being eroded by rapid advances in artificial intelligence and software.

Since automation/software is now eating higher-skill jobs, advancing the skills of workers does not automatically create jobs for them. Pushing the entire populace to get a college diploma does not automatically create jobs that require college diplomas.

The conventional narrative overlooks a key dynamic in the Third Industrial Revolution: *the number of skilled workers needed to eliminate entire industries of highly skilled employees is much smaller than the workforces being eliminated.*

Craigslist, for example, has fewer than 50 employees but single-handedly wiped out thousands of middle-class jobs that were once supported by classified advertising in the print media.

Coding software—what many still see as the engine of future job growth—is itself being automated. Teaching everyone how to program will not automatically create millions of new jobs as machines take over many labor-intensive parts of programming.

In many cases, programming is already a process of grabbing chunks of code from online libraries and stitching them together: drag-and-drop replaces cumbersome coding. In other cases, automated systems such as MIT's Helium can clean up and optimize legacy code in an hour, a project that could take months of human labor.

In a world of global competition and tight budgets, a program that can do the work of dozens of humans in a few hours (and do it better) is manna from heaven.

Two features of automated programming help us understand why the Third (Digital) Industrial Revolution is different from the previous two Industrial Revolutions.

1. The work of writing the code will not have to be repeated. It only needs to be written once. Once it has been created, the program will chew through thousands of lines of legacy software code automatically, learning more as it goes along.
2. A digital copy can be distributed globally at near-zero cost.

These features help us understand why automated programming will not create more highly paid jobs for humans than it destroys: the entire purpose of automated software is to dramatically lower costs and improve output by eliminating human labor and the costs of delivery and operation.

Human Labor Is the \$450 Option, Automation is the \$45 Option

The faith that technology will create more jobs than it destroys is understandable. The standard narrative has only two mechanisms for creating jobs: profit-maximizing enterprises and government. If these sectors cannot create jobs more jobs than technology destroys, the standard narrative has no solution.

Mainstream economists are gingerly exploring this job-destroying black hole. Erik Brynjolfsson, Andrew McAfee and Nobel Prize winning economist Michael Spence wrote in 2014 that "Should

the digital revolution continue to be as powerful in the future as it has been in recent years, the structure of the modern economy and the role of work itself may need to be rethought.”

Though they were careful not to predict the digital revolution will continue at its current pace, the reality is that the revolution is picking up speed. Rather than hope software will lose its appetite for eating up jobs, we can anticipate its appetite will only increase.

Why is this so?

Jobs are not created by magic or by abstract theories. Jobs are created one at a time, by offering someone else a paycheck to perform work that is profitable. If software can perform the work faster, better and cheaper than a human, it makes no financial sense to pay a human to do the work.

Only employers fully grasp the impact of digital technologies on job creation, because they're the only ones who have to ask: does hiring another employee make financial sense?

The vast majority of the workforce are employees, and have no experience being an employer. This places an *experiential limit* on our collective understanding of the realities of creating jobs. What sounds plausible in the abstract to those with no experience of payroll expenses outrunning income (i.e. losing money) is often impractical in the real world.

In the real world, hiring more employees could bankrupt you and your enterprise.

The mainstream media glorifies the very few at the top of the entrepreneurial food-chain who reap billions in profits, but in the trenches of the risk economy, it's difficult to earn a profit. In this world, staying alive requires reducing human labor or extracting more value from each employee.

Capitalism's core function is to generate profit and expand capital. Creating jobs is not the core purpose of capitalism, nor is it the government's core purpose. We take it for granted that employment will expand as a secondary effect of capital and the state (i.e. government) pursuing their core purposes, but in the digital global economy, this can no longer be taken for granted.

The reality is that enterprises and states have to adopt labor-saving technologies to survive. Confirmation can be found by simply scanning current headlines: the U.S. Navy is looking at 3-D fabrication of ships (not components, *entire ships*), Chinese manufacturers turn to fully automated factories, self-driving trucks take to the road, and even jobs that seem too low-tech for robotics such as harvesting tea leaves are being automated.

Automation is not an option that can be rejected in favor of business as usual. As we shall see in a moment, automation is the inescapable result of structural forces that only grow stronger. Chief among these is the rising cost of human labor—not just in developed countries, but everywhere.

There is a widespread sense of disbelief that automation can eat high-skill, middle-class jobs in the same way that it ate low-skill agricultural and factory jobs. In this view, the 50 employees of Craigslist wiping out thousands of middle-class jobs in the classified ad industry was a fluke.

But the reality is that the strongholds of middle-class jobs—for example, healthcare, education, government, and national defense—are all increasingly unaffordable and therefore ripe for wholesale creative destruction of costs, jobs and business as usual.

The conventional solution to rising costs in these industries is to raise taxes or borrow more money. But taxes can only go so high before they trigger recessions and other self-correcting mechanisms. Borrowing money eventually bankrupts the borrower, no matter how big. Is borrowing another trillion dollars an actual solution to soaring college costs?

These aren't sustainable solutions; they're wishful thinking.

The solution is to lower costs with technology—not by 3% or 5%, but by 50% or 90%.

Those earning a living in these unaffordable sectors defend the status quo by claiming that humans do a better job than machines and software, or that humans are essential, regardless of their cost.

In many cases, this is self-serving wishful thinking.

As for disregarding costs: *what we can afford is good enough*. As an example, an Apple iPad costs \$450. A tablet running the free Android operating system sells for \$45 (10% of the iPad's cost) in China and India. Yes, the iPad has some advantages over the \$45 tablet. But what are the advantages worth to those can't afford the iPad? What are the *opportunity costs* of opting for the product that costs 10 times more than the commoditized version? In other words—what else could have been done with the \$405 saved by buying the cheap tablet? What else could have been done with the interest paid to borrow the additional \$405?

Research suggests children given tablets with games designed to teach them to read and write learn to read and write without any teacher at all. A teacher may be a plus, but if you can't afford one, a cheap tablet with instructional games does the job.

The more we learn about what makes education truly effective, the easier it is to automate those processes into software that works on \$45 tablets.

We can't be blamed for priding our human capacity for empathy and insight. These are valuable capacities. But if all we can afford is a \$45 tablet, singing the praises of the iPad is not a solution.

There are already robots in classrooms and robots designed to care for the infirm elderly. There are robots that return the wheelchair-bound to mobility. Software already does much of the flying in advanced aircraft.

Diehards are ready to declare fighter pilots as essential regardless of the cost, but what if we can no longer afford \$200 million-each fighter aircraft? *Regardless of the cost* is another way of saying *when somebody else is paying the bills* or *put it on the credit card*. Neither is a solution; both are wishful thinking.

If all we can afford is a robot caregiver, the solution becomes improving the robot's capabilities, not trying to replace it with a costly human. If all we can afford is a pilotless aircraft guided

from the ground, the solution is not to borrow \$1 trillion to build obsolete fighters that satisfy our desire to appear essential. The solution is to improve the pilotless aircraft's capabilities.

That unaffordable and inefficient systems should be replaced is both obvious and necessary, but we resist this because we recognize the jobs lost cannot be replaced.

Consider the way we currently handle medical tests. The patient drives to a clinic or hospital, waits in a room (a total waste of potentially productive time) while a vast bureaucracy processes the interaction and payment. A sample is taken and the patient drives back to work or home. The samples are shipped to a lab, where highly paid staff process them. Results are then entered in a system and distributed to the patient and the doctors/nurses.

All of this consumed costly fuel, time and labor. Even worse, the readings are snapshots that can be deceptive. What if hospitals make the patient anxious? (I raise my hand.) The patients' blood pressure reading will be higher than it is at home. The patient may be prescribed a medication that isn't really necessary.

Digital technology is enabling a much cheaper, more efficient way to handle tests. Patients wear digital devices that take continuous readings in real time. Smart phones are becoming monitoring devices that eliminate the travel, time and bureaucratic friction. There is no paperwork; the device sends data to caregivers digitally.

Claiming the current system is necessary and effective is absurd. It is clearly wasteful, unaffordable, inefficient and unnecessary.

Replacing it will eliminate far more jobs than are created in software development. There is no equivalent expansion of jobs, and no going back to high-cost, wasteful, inefficient systems that generated the jobs.

Roughly 50% of healthcare expenses in the U.S. are devoted to the 5% of the populace with multiple chronic diseases. If technology can reduce the costs of monitoring and treating these patients by eliminating human labor, we will eventually have no choice but to pursue this cost reduction. Putting the ballooning cost of healthcare on the national credit card is not a sustainable solution.

Higher education boils down to a simple premise: once a student learns how to learn, they don't need a complex bureaucracy to learn. As I outlined in my book *The Nearly Free University and the Emerging Economy*, a 90% reduction in higher education costs are not just possible but necessary.

Digital technologies enable radical reductions in cost and improvement in results.

Why pay 10,000 instructors to deliver middling-quality lectures when a superior lecture is online for free? Why maintain costly campuses and bureaucracies when most students don't even need to set foot on campus and lessons can be delivered without the bureaucracy?

All the justifications of the status quo in healthcare, education and national defense are the equivalent of hectoring the person with \$50 to buy the \$450 iPad instead of the \$45 tablet. Insisting the person with \$50 buy the \$450 device because it might be marginally better is not a solution.

Perhaps the \$1 trillion F-35 fighter aircraft is marginally better in certain circumstances, but aircraft piloted from the ground that cost 90% less are better in many other circumstances—a fact never mentioned by those defending their jobs in the status quo.

A sprawling campus and highly paid staff may be better than online learning linked with apprenticeships in certain circumstances, but in many other situations, learning within the directed apprenticeship model is far more effective than forcing students to sit through four years of lectures to earn an incredibly costly credential with rapidly depreciating real-world value.

At the risk of annoying those who dislike repetition: *Regardless of the cost* is another way of saying *when somebody else is paying the bills or put it on the credit card*. Neither is a solution.

Technology is eating skilled middle-class jobs the same way it ate low-skill jobs, and as a result of soaring costs, its appetite for middle-class jobs is growing. The jobs created by lower-cost technologies are themselves prone to automation once the initial development has been done.

Human labor is the \$450 option, and saying it is essential doesn't help those with only \$50. Their only rational choice is to buy the \$45 option, and work on improving the output of that low-cost technology.

The Flaws in Guaranteed Income for All

Let's return to the second conventional solution in the narrative of what happens when automation eliminates huge swaths of paid human labor: a guaranteed minimum income is to be paid to all, funded by taxes collected from those reaping profits from robots and software.

This is the *super welfare state solution*: the government collects enough taxes to pay social welfare benefits not just to the temporarily unemployed and those who cannot work (children, disabled and the elderly) but to the majority of citizens, not just during one phase of their lives, but for their entire lives.

The most obvious problem with this solution to mass unemployment is the math doesn't work: the owners of robots and software cannot make enough profit to pay the staggering costs of a guaranteed minimum income distributed to tens of millions of jobless households.

A quick look at current government spending and corporate profits illustrates the disconnection between the costs of guaranteed minimum income for all and reality.

The U.S. federal government currently spends \$3.2 trillion annually, and roughly two-thirds of this is for programs such as Social Security (income security), Medicare, Medicaid, housing subsidies, SNAP (food stamps), unemployment and so on.

Estimating the cost of *guaranteed income for all* is difficult if we don't know the total number of households that will collect this benefit and the size of the benefit, but we can certainly anticipate the costs will be much higher than current spending.

State and local government spend another \$3 trillion, so in total government spends over \$6.2 trillion annually in the U.S. This is roughly 36% of America's \$17 trillion gross domestic product (GDP). That's a lot of taxes that must be collected from enterprises and wage earners.

- Every person who loses their job to automation increases the cost of *guaranteed income for all*. If millions of people lose their jobs, the costs of *guaranteed income for all* will skyrocket.
- Every person who loses their job stops paying payroll and income taxes. If millions of people lose their jobs, government tax revenues plummet accordingly.

Total corporate profits in 2015 are about \$1.8 trillion. If the government took every last dollar of corporate profit (which is obviously impractical), this is less than 30% of total government spending.

But—so goes the conventional thinking—digital companies will be even more profitable than the existing batch of companies.

Is this reality-based or just more wishful thinking?

Let's take three tech giants that virtually everyone holds up as positive examples of growth in the digital economy: Google, Facebook and Twitter.

Google has revenues of \$70 billion (as of mid-2015), net income (profit) of \$14 billion, and 55,000 employees worldwide. (Their U.S. based work force is around 33,000.)

If Google's entire net profit was taken by the federal government, we'd need 443 Googles, each reaping \$14 billion a year to fund all government expenditures.

But there is only one Google on the planet, and there isn't enough oxygen for another Google, much less hundreds of equivalently profitable corporations. Google already handles the vast majority of web searches.

If we assume those 443 highly profitable corporations would each need 33,000 U.S. based employees to operate, we'd have about 15 million private employees—roughly 10% of the American workforce of 150 million.

Facebook has 10,000 employees globally and generated net income of \$2.8 billion. We'd need 2,214 Facebooks to fund all government spending. Those 2,214 companies would have a workforce of 22 million employees—less than 20% of the workforce.

But there is only one Facebook on the planet, and an equivalent company or two in China. What the other 2,213 highly profitable digital companies going to do to generate billions in profits and employ 10,000 people?

Consider Twitter, with its global reach and 3,900 employees. Its earnings before interest, taxes, depreciation and amortization (EBITDA) are -\$339 million. Yes, a loss. It's a growing company, so perhaps it will earn a net profit soon. But there are no guarantees of that.

So how many Twitter equivalents do we need to fund \$6.2 trillion in government spending? If companies aren't highly profitable, there's nothing to tax. And if they don't have many employees (recall Craigslist's 50 employees), there won't be enough payroll to reap \$6.2 billion in taxes.

In each of these cases, the company dominates its sector; there isn't enough oxygen for even one more Google, Facebook, Twitter or Craigslist, never mind thousands of such digital companies.

This is a very simple model, obviously, as I haven't counted taxes Google paid before net profit was calculated, the payroll taxes paid by the employees, and so on. But the point is that a guaranteed income that requires \$7+ trillion of taxes needs highly profitable corporations and tens of millions of well-paid employees paying substantial taxes.

If neither of those conditions applies, then the guaranteed minimum income idea is impractical: as profits and jobs decline, so do taxes.

Whether we like it or not, the guaranteed minimum income solution to mass unemployment is just wishful thinking. Even the most profitable digital companies generate only a tiny slice of the profits and payrolls needed to fund guaranteed income for all, and they employ an equally tiny slice of the workforce.

And this is assuming there is never a recession—a very foolish assumption indeed!

In recessions, corporate profits tend to fall precipitously. Were profits to fall to \$1 trillion (as they have in previous recessions), corporate taxes would barely cover 15% of current government expenditures—never mind that the cost of *guaranteed income for all* would soar as corporations slash payrolls.

Proponents of guaranteed income reckon increasing taxes on landlords, polluting industries, sugar and alcohol, etc. would pay for the added costs. The problem is there are already steep taxes on virtually all of these categories, and a quick glance at the actual profits each generates reveals that the increased taxes would fall far short of replacing all the tax revenues lost as profits decline and jobs vanish.

The only possible conclusion: guaranteed minimum income for all is *wishful thinking*.

But there's an even bigger hole in this narrative, as we shall see.

Automation Commoditizes Labor, Goods and Services, Slashing Profits

As automation eats jobs, it also eats profits, since automation turns labor, goods and services into commodities. When something is *commoditized*, the price drops because the goods and services are interchangeable and can be produced almost anywhere.

The \$45 tablet can be assembled anywhere, and the software can be coded anywhere.

Big profits flow from scarcity, i.e. when demand exceeds supply. If supply exceeds demand, prices fall and profits vanish.

The cost of automation and robotics is falling dramatically. This lowers the cost of entry for smaller, hungrier, more nimble competitors, and lowers the cost of increasing production.

The parts needed to assemble a \$45 tablet are dropping in price, and the profit margins on those parts is razor-thin because they're commodities. Software such as the Android operating system is free, and many of the software libraries need to assemble new software are also free.

Automation increases supply and lowers costs. Both are deadly to profits.

So here's the core problem with the idea that taxing the owners of robots and software will fund guaranteed incomes for all: *the more labor, goods and services are automated/commoditized, the lower the profits.*

The current narrative assumes more wealth will be created by the digital destruction of industries and jobs, but real-world examples suggest the exact opposite: the music industry has seen revenues fall in half as digital technology ate its way through the sector. A \$14 billion industry is now a \$7 billion industry. Profits and payroll taxes collected from the industry have plummeted.

As subscription music services replace sales of songs and albums, revenues will continue to decline even as consumers have greater access to more products. In other words, the destruction of sales, employment and profits is far from over.

Examples of such radical reductions abound in daily life. To take one small example, our refrigerator recently failed. The motor was running but the compartment wasn't being cooled. Rather than replace the appliance for hundreds of dollars or hire a high-cost repair service, I looked online, diagnosed the problem as a faulty sensor, watched a tutorial on YouTube (what I call *YouTube University*), ordered a new sensor for less than \$20 online and completed the repair at no cost beyond a half-hour of labor, which cost me nothing in terms of cash spent.

The profit earned by YouTube was minimal, as was the profit of the firms that manufactured the sensor and shipped it. The sales and profits that were bypassed by using nearly-free digital tools were an order of magnitude higher.

I was recently interviewed via Skype by an online journalist with millions of views of his YouTube channel. A decade ago when he worked in mainstream TV journalism, an interview required costly, time-consuming travel (for the crew or the subject), a sound engineer, a camera operator, the talent (interviewer), editor and managerial review. These six jobs have been rolled into one with digital tools, and travel has been eliminated entirely.

Some will argue that the quality of the video and sound isn't as high, but the quality of the user experience is ultimately based on the viewer's display, which is increasingly a phone or tablet. So in terms of utility, value and impact, the product (i.e. *output*) produced by one person replaces the conventional media product that required six people.

My own solo digital content business would have required a handful of people (if not more) only a decade ago. With digital tools and services, it now requires just one person. Those of us who must work with digital tools to survive know firsthand that what once required a handful of workers must now be produced by one person if we hope to earn even a marginally middle-class income.

Multiply an appliance that doesn't need to be replaced and a repair service that doesn't need to be hired, a half-dozen positions replaced by one part-time job, a commodity device that costs 10% of the high-profit brand and you understand why profits will plummet as software eats the world.

These are not starry-eyed examples based on projections; these are real-world examples of digital technologies destroying costs, sales and profits on a massive scale.

Some observers have suggested taxing wealth rather than profits to fund the super welfare state. But the value of assets ultimately rests on their ability to generate a profit. As profits fall, wealth may be more chimerical than these observers believe.

The Rising Cost of Human Labor

There's another driver of automation the conventional narrative misses: the rising costs of human labor.

Unlike a human worker, a robot doesn't require healthcare insurance, worker's compensation, 401K pension benefits, and all the other costs of labor overhead. A robot doesn't go on strike for higher wages.

As socio-economist Immanuel Wallerstein has observed, the cost of labor is rising globally as a result of structural forces that are immune to productivity gains, recessions, tax credits or other factors:

1. Urbanization
2. External costs (environmental damage, etc.) that must now be paid
3. Rising payroll taxes as the public demands more services from the state

These trends are especially visible in China, which has seen wages soar, costs of pollution control soar and demands for state services soar.

So where does this leave us?

- Technology no longer creates more jobs than it destroys.
- Profits decline as automation commoditizes labor, goods and services globally.
- Digital and robotic tools are falling in price while the cost of human labor inexorably rises.
- As costs of automation plummet, barriers to entry fall and competition increases, pushing everyone into automation if they want to survive.

As profits fall and jobs are eliminated, the tax base narrows and the state collects less tax revenue. Even the state must automate to reduce costs.

Put all these together and the conclusion is inescapable: the conventional narrative solutions (belief that more jobs will be created than destroyed, guaranteed income for all) are wishful thinking.

The same can be said of calls for the state to hire tens of millions of displaced workers in a supersized *make work* program—where is the money going to come from as tax revenues falter?

Yes, government can borrow money, but this is not a sustainable way to fund tens of millions of jobs. If profits and job growth aren't coming back, borrowing money is a temporary stopgap, not a solution.

The System Can't Solve the Problems of Automation

Let's summarize what we've found so far in terms of systems.

The conventional narrative claims the current system will automatically create more jobs without us having to do anything different. And if this turns out to be false, then the system will give everyone a guaranteed income for life, without changing anything but the tax rate on the companies that own the robots and software that ate all the jobs.

Both solutions are completely impractical, with no basis in reality. Both are wishful thinking.

But that's not all that's wrong with the conventional system.

Poverty Is More than Material

The conventional narrative does not recognize that the loss of jobs includes a loss of purpose and social cohesion. In the fantasy version of guaranteed income, people receiving a guaranteed income are free to explore literature, compose music, create artwork, play games and live a life of productive leisure. Freed from the burden of work, people will consume the goods and services created by automation.

This fantasy overlooks the reality that communities that are given free housing, food and healthcare are breeding grounds for self-destructive pathologies, depression, ill-health and unhappiness. The public intellectuals who espouse the fantasy of creative leisure base their vision of Utopia on their own peer group, the most educated, most motivated, most accomplished and most ambitious 1% of the workforce. Most people are not able to sustain purpose and meaning outside a work environment that provides meaningful social roles.

Work is the foundation of purpose and positive social roles; leisure and consumption are not.

Researcher John B. Calhoun found that once the number of individuals capable of filling social roles exceeds the number of roles available, social cohesion breaks down, and the resulting pathology of shared hopelessness creates what Calhoun called a *behavioral sink*. Hope and the human spirit are both destroyed by this bottomless black hole.

Though we think of poverty in material terms, the deeper loss when jobs disappear is the loss of positive social roles, purpose and meaning—not just a reason to get up in the morning, but a reason to contribute. Simply giving people money does not automatically create positive social roles. Rather, it reinforces a self-destructive state I call *permanent adolescence* in which a focus on leisure and consumption trivializes human life. This stripping away of social roles in favor of consumerism leads to self-absorption and a loss of purpose, pride and meaning.

That economists are blind to the terrible impoverishment of human life when meaningful work disappears is astounding, and reminds us that *work isn't just a financial arrangement*; it is a social arrangement and a source of individual pride and purpose.

The loss of jobs is not just a loss of income but a poverty of opportunity to acquire ownership of the *engines of wealth creation*. People don't want to just get by; they want to get ahead. Giving them a free stipend robs them of the opportunity to do more than just scrape by.

Job loss dismantles not just incomes but the ecosystem of community that work and jobs construct. Take away the jobs and you get what author Yann Moulier-Boutang has called the “poverty of social organization.”

The problem with guaranteed income isn’t that it aims too high, but that it aims too low. Rather than empower people with secure jobs, it strips away social roles and opportunities that only work provides.

Growth Is Not a Sustainable or Positive Model

Yet another gaping hole is the assumption that growth—of consumption, production, sales, profits, wages and taxes—is the highest good because growth is presumed to raise all boats like an incoming tide.

This view made sense when resources were cheap and plentiful. But with 7 billion people aspiring to a middle-class life, there are constraints on resources. The oceans, for example, have already been stripped of many species. Depleted soil and fresh water aquifers cannot be restored if demands on these resources keep expanding.

The digital revolution is eating the world partly because it consumes fewer resources. For example:

- Rather than invest cement, steel and vast quantities of energy in constructing thousands of new hotel rooms, Airbnb makes thousands of new rooms available within existing buildings.
- Car sharing enables a number of people to have access to a vehicle without every person buying and maintaining a vehicle. This *access not ownership* model is a much more efficient and resource-stingy way of living, but by making better use of fewer vehicles, it kills the conventional god of growth.
- Music labels once shipped records or CDs to thousands of outlets; now listeners download digital files.
- Books that were once printed in mass quantities and shipped to retailers (who shipped unsold copies back to the publishers, who then shipped them out again to be remaindered) are now printed on demand: when a customer orders a copy, the book is printed and shipped (or delivered digitally at near-zero cost). All the wasted transport of the old model has been eliminated.
- Where a separate device was once required to listen to music, watch TV or open a spreadsheet, now a single mobile device does it all.

These are just a few examples of the way digital technologies reduce costs and growth as measured in sales, energy consumption, etc.

For a system that requires permanent growth, this is fatal. *Faster, better, cheaper* means fewer profits, fewer jobs, less consumption, and a narrowing tax base. Everyone focuses on the few companies that reap big profits from this destruction of established sectors, but few add up the profits and jobs lost.

The initial disruption reaps big profits, but this is a one-off: once the old way of doing things has been replaced, the big gains dwindle as the new technology is itself commoditized.

What's good for sustainability (lower consumption of resources, goods and labor) is fatal to the narrative of permanent growth.

There's another gaping hole in the *permanent growth is necessary* narrative. This narrative is based on the oft-repeated idea that human desires are limitless and therefore sales and profits can expand forever as these infinite desires are met by the production of more goods and services. But is this idea actually true?

Starting from a point of material deprivation, it seemed like wants were unlimited. But the core human needs are actually quite limited. Beyond the physical requirements of food, water and shelter (in Maslow's *hierarchy of needs*, the physiological necessities), human needs are intangible and cannot be filled by profit-maximizing companies or the state. The idea that human desires are limitless and can be profitably filled by more goods and services is impoverishing and adolescent. Human life is more than just the fulfillment of our desires.

For example, friendship is clearly a human need. Can a product replace friendship? No. Can friendship be bought or rented? No. What if consumerist superficialities have eroded our experience of real friendship in ways we have difficulty even detecting?

Permanent growth requires endless marketing of increasingly marginal goods and services. I call this process *the financialization of the human experience*: every human interaction and emotion is transformed into a financial transaction that benefits a profit-maximizing company, bank and the state, which needs financial transactions to generate its tax revenues.

To prompt the purchase of unneeded goods and services, marketing undermines the authentic self in favor of narcissism and self-gratification.

The process of permanent consumerist growth is simple:

- Generate insecurity and self-doubt by marketing impossible standards: only those who are thin, fit, super-smart, witty, personable, creative, wealthy and appropriately humble are worthy.
- Make buying a good or service the solution to inadequacy.

Creating insecurity that can only be resolved with impulsive purchases of signifiers generates the destructive state of *permanent adolescence*.

Once we scrape away the marketing and grasp the full consequences, we realize that the ideology of permanent growth is a disaster, not just for the overburdened planet but for every individual and culture ensnared by this perverse fantasy.

The entire narrative of unlimited desires driving ever-expanding growth and profits is not only false, it is counter-productive. The focus on marketing unnecessary goods and services that fill our most adolescent desires and insecurities actively inhibits our fulfillment of the intangible needs of friendship, reciprocity, belonging, purpose, positive social roles and empathy.

The Knowledge Economy and Cognitive Capitalism

Phrases like *knowledge economy* and *cognitive capitalism* cause our eyes to glaze over.

What do they mean? Do they refer to something real, or are they just academic abstractions?

What they describe is real, but maddeningly ambiguous, as things aren't always as cut and dried as we'd like in the middle of revolutions—in this case, the Third (Digital) Industrial Revolution.

So let's burn some calories figuring out what these terms mean in the real world.

What authors Moulrier-Boutang and McKenzie Wark term the *knowledge economy* (or *cognitive capitalism* in Boutang's phrase) is a different system from hierarchically-organized corporations, states and labor.

In this new arrangement, the once-sharp lines separating ownership, labor and assets blur, and production is no longer limited to conventional labor making things or providing services. Cognitive labor, in the form of research and development, logistical management, etc., fuels the transformation of intellectual activities into tradable assets.

Value is generated by the *network*, a new organizational form that is unlike the traditional hierarchies of corporations and states. Economist Michael Spence (among others) has observed that value (in the form of assets and profits) flows to what's scarce.

- Since automation and software excel at turning processes into commodities, commoditized goods/services create very little value/profit.
- Since central banks have pushed the cost of credit to near-zero, capital is easily borrowed for next to nothing and consequently it also has little scarcity value.

The value in the knowledge economy is not just any knowledge, but knowledge that increases productivity, which we can summarize as *faster, better, cheaper* and *doing more with less*.

Productivity depends on innovation, which is itself dependent on collaborative skills and cross-fertilization of various knowledge bases.

As Spence and co-authors Andrew McAfee and Erik Brynjolfsson observed in their 2014 essay, *Labor, Capital and Ideas in the Power Law Economy*, neither capital nor labor have scarcity value in the age of automation and nearly-free credit. "Fortune will instead favor a third group: those who can innovate and create new products, services, and business models."

Value in the knowledge economy is not distributed equally. The returns on human labor and capital are very low, while the scarcity of skills and knowledge that create new business models drives most of the gains to the creative class: "The distribution of income for this creative class typically takes the form of a power law, with a small number of winners capturing most of the rewards. In the future, ideas will be the real scarce inputs in the world -- scarcer than both labor and capital -- and the few who provide good ideas will reap huge rewards."

In his *Information Theory of Capitalism*, author George Gilder proposed that the economy is fundamentally a system that rewards learning and knowledge. Its conventional features—investing capital wisely and distributing wealth—are secondary. Commentator Bill Bonner offered this explanation: "Information, says Gilder, is always surprising. It tells us things we

didn't know. The person who is the source of most important new information is the entrepreneur."

Learning is difficult and costly. Developing new ideas and applying them in the real world is a risky, uncertain process. From this perspective, rewards flow not just to what's scarce but to what's risky. Since most ideas fail to reach fruition, new ideas that succeed are intrinsically scarce.

In other words, there is no risk-free way to identify and exploit scarcity in a knowledge economy.

The value in work is identifying what's scarce, which increasingly includes intangibles such as *attention and care*. Collaboration, responsiveness, autonomy and inventiveness—core skills in the creative class of cognitive capitalism—are difficult to measure in traditional terms.

What is the hourly rate for autonomy and inventiveness?

The rewards depend on the value of the output, which is intrinsically unpredictable.

If we understand risk and scarcity, we understand why the traditional model of paying people for their time no longer makes any sense. Even paying people for their skills makes no sense, since there is no guarantee that these skills will generate new ideas that create value.

This leaves us with a sobering realization: there is no hourly rate for autonomy and inventiveness. The value depends entirely on the output of the work.

The knowledge economy richly rewards cognitive *piecework*—being paid for what was accomplished, not the time spent performing the work. But unlike the conventional factory model, the value of the work isn't known in advance, since the most valuable products are not new ideas but *new ideas that reach fruition*.

Ownership of the new ideas is not the same as ownership of mines, ships and factories, as new ideas can be digitally distributed for free.

In his 1993 book *Post-Capitalist Society*, Peter Drucker identified the worker's knowledge as the *means of production* in the knowledge economy.

In the traditional economy, the means of production were assets such as factories that hired labor by the hour to produce goods and services. This division alienated the worker from the value of his labor. The knowledge economy reconnects the rewards with the owners of the new means of production: the cognitive creators themselves.

The network offers new ways to organize work and produce value. Centralized hierarchies are no longer needed to manage workers and tasks; self-directed creators collaborate on projects and share income streams without a managerial hierarchy overseeing their work.

If we follow Christopher Lasch's analysis of commoditization in his book *The Culture of Narcissism*, we find that it's not just employees who are interchangeable—employers are equally interchangeable. The interchangeability of work, employees, employers, products and services is the key characteristic of commoditization.

If you find all this frustratingly imprecise, I share your frustration. Even though I work in the knowledge economy and am living in the world of cognitive capitalism, I am hard-pressed to make sense of my work or value in conventional terms such as hourly rates.

Even though this framework of value creation defies easy quantification, it doesn't mean it is any less real than traditional economic structures. Yes, the world still needs manufactured goods, agricultural produce, plastics, glass, energy and all the other products of an industrial economy. But as these tangible essentials are increasingly produced by automated processes, their potential to create value decreases accordingly.

As value is increasingly derived from intangible assets, knowledge and networks, it becomes increasingly difficult to make sense of value creation in conventional terms.

Scarcity and value in cognitive capitalism are often ephemeral and elusive.

My own work could be categorized as *content creation*, but how is this different from content created by software? There are already programs that churn out content based on simple statistics and narratives: Player A scored a goal in the third period, putting Team B ahead, and so on.

If my content is identical to essentially cost-free content created by software, it has very little value.

I think it more accurate to say that I *make sense* of the floodtide of data that wash over us every day.

Someone might code a program that does this as well as I can. When that happens, I will have to do so with more wit and insight than the software or my product will lose its scarcity value.

Should the software's product become wittier and more insightful than my output, I will have to increase a difficult-to-program quality in my work: perhaps it will be *authenticity*, an elusive intangible that humans, with their finely attuned BS detectors, recognize intuitively.

If a sense of humor and whatever other elusive qualities human writers slip into our product get automated, then my work will lose its scarcity value, and I will either have to work for free, beg ("please help support one of the last few human writers of authentic commentary!"), or close up shop.

We can generalize this search for scarcity in a rapidly automating world in this way: those who are most adept at extracting maximum value from machines and software, and then adding what machines and software cannot do on their own, will be scarce.

- Surgeons who extract the most work from robotic surgical tools and then do whatever the robot cannot do on its own will generate the most value.
- Attorneys who extract maximum utility from expert legal software and then bring to bear their courtroom skills or persuasive writing skills will create the most value.
- Software engineers who extract maximum utility from libraries of existing code and automated tools will generate the most value.

Those who do not know how to extract value from the most productive robots and software will not be able to create much value.

This process is not always obvious. Here's an example. We were invited to lunch at our friends' home in Santa Clara a few weeks ago. He's a research scientist at a leading technology company, and she's completing a PhD in computer science.

The husband and I were discussing automation, and I jokingly said that my ability to fix a kitchen faucet is still valuable because programming a robot to perform the troubleshooting, reach under the sink to loosen the fastening nut, and so on would be costly and so it's still cheaper to pay a human to do the repair.

He observed that this would only be true until the faucet was designed specifically to be easily repaired by a robot.

In other words, the architect who designs a building so it is not only well-designed but easy for robots to build will create the most value.

The designer who makes the faucet easy for robots to repair will have created value that is not easy to price, since the ease of repair will last the lifetime of the product.

Our researcher friend suggested self-driving trucks might complete the long haul routes on their own, and then pull over to pick up a driver for *the last mile* through congested city streets.

Once again, the value of human labor is making best use of automation and then adding whatever the software cannot do—in some cases, simply the reassurance that a human is present and watchful.

What's scarce in this new network-based organizational form is knowing how to extract the most value from commoditized technology. Another way of understanding this is: *what's scarce is the ability to choose what to optimize and how to optimize it*. There are always trade-offs in what is being optimized, and those trade-offs are nuanced and dynamic. These skills are difficult to automate because the inputs are constantly changing and may defy quantification.

Increasingly, the resources needed to be productive are free online. But the skills needed to make best use of this vast trove of free resources are not that easy to acquire.

For example, last month a friend emailed me a software script to automate a tedious archival job I needed done. I couldn't get the script to work (no surprise there, I am not a programmer) so I found a CSS template online and tweaked the code to fit my needs. It didn't optimize the task the script performed, but it optimized other aspects of the project.

I could struggle to learn enough of the script's programming language, or I could optimize some other aspect of the project. That choice depended not just on my existing skillset but on a calculation of the future payoff of the project and the potential value of whatever skills I invested scarce time to learn.

For someone anticipating a future in developing software, learning the programming language would have likely been the higher value choice, even though the payoff from the first project

was low. But choosing what to optimize is not necessarily obvious, nor is learning *how* to choose what to optimize.

One of the few things we can say with any confidence is that those who develop skills on levels 3 and 4 of Norman Webb's *Depth of Knowledge* (DOK) spectrum (reasoning, inference, planning and investigation) are more likely to grasp the complexities of choosing what to optimize and how to optimize it most productively.

The four levels are:

DOK 1: recall

DOK 2: applications of skills and concepts

DOK 3: strategic thinking

DOK 4: extended thinking

DOK level 2 is easier to automate. Learning one computer language is not enough to ensure your job won't soon be eaten by software. What's scarce is the ability to absorb new information and learn new skills quickly, flexibility, curiosity, attention to detail, adaptability, trustworthiness, responsiveness, autonomy and inventiveness.

These are the core traits of what I term the *Mobile Creative* class. This class is not necessarily mobile in the sense of moving between geographic locations (though they might be); they are mobile in the sense of moving easily between knowledge bases and skills.

Those with little experience in the trenches of technology may be tempted to think *Mobile Creative* work can create more jobs. But this misses the previous point, that automation and digital tools have eliminated 80% of the costs and labor in one sector after another. The 20% of the work that remains places a premium on a specific set of skills, values and motivations. Even if we train everyone in the work force to have those skills and values, it doesn't mean the jobs that were lost are coming back. Increasing the supply of labor does not automatically increase demand for that labor.

Do the remaining jobs generate enough value to earn a moderately middle-class income? As skills become commoditized or automated, their value plummets and the income of those doing the work drops accordingly.

Limits of the Knowledge Economy and Cognitive Capitalism

What can we conclude about the knowledge economy and cognitive capitalism?

Let's start with a question: is this new economic structure stable enough, predictable enough and profitable enough to provide work for everyone displaced by automation?

I think the answer is clearly no. Not only is the number of jobs limited, so is the number of people with the skills, motivation and personality to thrive in an environment where, in Marx's famous description of capitalism, "everything solid melts into air, and the scarcity value of one's work is constantly shifting."

Those who thrive in this environment must absorb massive inputs of information and identify the useful wheat from the irrelevant chaff. They must enjoy learning new things every day, and feel comfortable with Andy Grove's dictum that *only the paranoid survive*: those who rest on their laurels get eaten by competitors or software.

As consultant Heather McGowan observed, "A worker's value is no longer primarily or exclusively about what she knows but rather the speed at which she can learn and apply—this is a dramatic and unsettling shift for many."

The value being created in cognitive capitalism is often not clear. It might be a second-order effect, or the payoff might come in the future. What is the hourly rate for autonomy and inventiveness? No one can say with any precision, because it depends on the scarcity of the output, i.e. the processes and products being produced.

Robin Chase, co-founder of Zipcar, calls this new organizational model *Peers Inc.*, peers opting to collaborate to create value: "Throughout the last century companies have made money by hoarding stuff: assets, intellectual property, people. In the new collaborative economy, sharing and networking assets, like platforms, car seats and bedrooms, will always deliver more value faster."

It's easy to glorify this new organizational structure, where the value is often in the network, not the traditional hierarchies of corporations and states. But the demanding world of cognitive capitalism is not easy to navigate, and I suspect most people find the insecurity of constantly shifting value undesirable.

I think it is unreasonable to expect everyone to develop the constellation of skills, values and traits needed to thrive in such an insecure world, and it is equally unreasonable to expect those seeking profits in this shifting landscape to pay people secure wages.

In other words, the regulations that govern conventional organizations don't work in the knowledge economy, at least not as originally intended. Many are either irrelevant or crippling.

Summarizing the Knowledge Economy

Let's summarize the knowledge economy:

- Value flows to what's scarce.
- Capital and labor are abundant and therefore have little scarcity value.
- As goods and services are commoditized, they lose scarcity value.
- Information and knowledge are also abundant.
- What's scarce is knowledge that results in new processes, products, services and models.
- Many new ideas don't lead to new products, models, etc.
- The process of finding value in new ideas is inherently risky.
- New ideas that automate/commoditize what has yet to be automated/commoditized generate the largest cost reductions and gains.
- Automation/commoditization reduces costs, profits and jobs.

The conclusion of all this is sobering.

Technology isn't going to create more jobs than it destroys.

In an increasingly competitive world of declining profits and rising costs, it is financial suicide to ignore automation in favor of maintaining business as usual.

The companies generating profits in a rapidly commoditized world will not be able to support guaranteed incomes for tens of millions of displaced workers, and borrowing trillions of dollars to fund a super welfare state is not sustainable or desirable, as rapidly rising debt bankrupts the borrower.

Wishful thinking about technology and guaranteed incomes guarantees failure.

Displaced workers need meaningful, secure work. Giving them enough income to scrape by is not enough, as the poverty of lost purpose, pride and positive social roles robs them of the essentials of human life.

The conventional narrative doesn't state this directly, but the unspoken conclusion is: technology is the source of our problems.

But this seems exactly backwards to me. What if technology isn't the source of the problem? What if technology is simply revealing the systemic flaws in the status quo?

Rather than being the source of the problem, what if technology is the solution?

These are the questions we'll explore in the rest of the book.

Questions That Need To Be Asked

The conventional narrative isn't just full of holes; it's incapable of asking questions that threaten its own coherence.

I previously noted two reasons why:

1. We can't imagine a world different from the one we currently inhabit (i.e. a *failure of imagination*)
2. Asking these questions threatens the status quo.

As a result, asking questions is not only not encouraged, it is suppressed via the usual mechanisms: ridicule, marginalization, and variations of *serious people would never ask such a question*.

There is a reason for this: *serious people are being paid not to ask such questions*. In other words, asking such questions could get you demoted, fired or shipped to the bureaucratic equivalent of Siberia.

Here's a question that needs asking: does money have to be created at the top of the pyramid of wealth and power? Put another way: why is the monopoly on creating money reserved for those at the top of the wealth/power pyramid?

Those who claim there is no other way to create money are wrong; technology now enables the *decentralized creation of crypto-currency money*. Money does not need to be created by banks.

Here's another related question: does money have to be borrowed into existence, i.e. the way money is created by banks?

The answer is no, money can now be created digitally and distributed via decentralized networks. It does not have to be borrowed into existence at the top of the pyramid. We will discuss this further in Section Two.

Let's ask another question: is there any connection between money creation and job creation?

The conventional narrative says, yes: money is borrowed into existence to build factories, shops, etc. that employ people.

But borrowing/creating money is not intrinsically connected to creating jobs. Consider the following:

- Let's say I borrow money into existence (i.e. I borrow money from a bank) and use it to buy an apartment building. I raise the rents 20% and immediately start profiting from borrowing the money. But this purchase did not create any new jobs.
- Suppose I borrow money and use it to buy back shares in my corporation. This reduces the number of shares outstanding and boosts the price per share, enriching my holdings of stock while creating no jobs.
- If I borrow money and use it to set up software that automates much of the work being done by my employees, the new money actually eliminates jobs.

These examples are not made up; these are precisely what wealthy individuals and corporations are doing with money created by central and private banks: snapping up income-producing assets, buying back shares and slashing payroll by investing in labor-saving automation.

Each of these increases the wealth of the borrowers without creating any jobs whatsoever.

So in the current way we create and distribute money, there is no intrinsic connection between money creation and job creation. This system of money creation/distribution actually accelerates the concentration of wealth and the destruction of jobs.

This raises another question that is never asked: what if money was created by labor? What if the way to create more money was to do more work? In such a system, money creation would be intrinsically linked to the creation of goods and services. New money would flow to those creating goods and services, i.e. those at the bottom of the wealth/power pyramid rather than at the top.

Money would not be borrowed into existence, so there would be no interest due. Banks would have no role in the creation or distribution of this money. Rather than fuel speculation by already-wealthy individuals and corporations, *this new money would flow to those actually improving the world.*

Here's yet another question: what happens when money is borrowed into existence by banks?

Since the new money is borrowed, it is only distributed to those with substantial income and assets (collateral) to support the new debt—in other words, those who are already wealthy.

Those who aren't already wealthy are charged a high rate of interest that effectively transfers a large chunk of their income to the banks.

In other words, borrowing money into existence benefits the banks and the already-wealthy. It siphons income from those with limited incomes and transfers it to the top of the pyramid.

The net result of borrowing money into existence and distributing it at the top of the wealth pyramid is rising inequality. Though apologists (i.e. serious people paid to support the conventional narrative) will claim otherwise, *rising income/wealth inequality is the only possible output of the current financial system*. Given the design and inputs of the system, there are no other possible outputs other than concentrating wealth and power and rising inequality.

Here's another question: what is work?

The typical answer is: labor paid to complete tasks.

But is that really the sum total of what work is? Or is there more to work than getting paid to complete tasks?

What if instead we define work as *creating value*? That raises another question: just how do we assess value?

The conventional narrative answers: work that generates profit has value. The problem with this definition is work can be valuable but not profitable.

Consider the construction of a bikeway—a pathway reserved for bicycles. The project has self-evident value, as bike-only lanes reduce collisions with autos, promote better health by encouraging bicycling and reduces vehicular traffic congestion as people use bicycles instead of autos for some trips.

But none of these indirect benefits is profitable. A profit-maximizing enterprise could only justify building a bikeway if the bikeway generated direct revenue by charging bicyclists to use it. While this is one way to generate profits, it defeats one of the main purposes of the bikeway, which is to encourage safe bicycling for the entire populace, not just those who can afford to pay a fee.

What if we define *creating value as meeting the needs of the community*? This covers profitable and unprofitable work: some of the needs can be filled by profit-maximizing enterprises, while others are intrinsically unprofitable. This definition of value opens the door to an entire range of work that creates value without being profitable.

Let's ask a question that no serious person would dare ask: why isn't conventional work more fun?

Since many tasks are not inherently fun in the same way a beach party is fun, let's rephrase the question: what makes people want to go to work, even if the tasks are difficult or unpleasant?

There is no one answer, so let's list a few of the main motivations not directly related to the obvious (and important) one of earning money:

- The person feels needed at work
- The person performs work that is valued

- The person has a say in the work being organized and performed
- The person has a stake in the output beyond his/her wage
- The person takes pride in his/her work, and this pride generates self-worth and identity
- The person feels part of a team
- The work advances their career and/or goals
- The work has meaning

If we had to summarize these points, we might say the person *has autonomy, dignity, ownership and a positive social role*. Having a say in one's work is a form of autonomy. Having a stake in the output is a form of ownership. Being valued as a contributor and having one's work valued defines *a positive social role* that provides dignity, identity and self-worth. Being part of a team provides membership and belonging to something larger than oneself. Work that advances one's career and life goals *builds human and social capital*.

What do we mean when we say work has meaning? That it's profitable to the enterprise? That it has value?

There is more to meaningful work than just creating profit or value. Meaningful work is work that offers participation, not just following orders. Meaningful work offers a stake in the output and the opportunity to build capital, which is the foundation of wealth. Meaningful work advances the worker's personal goals. Meaningful work is recognized as valuable in the community because it is meeting the needs of the community.

If we ask why someone wants to go to work, they might not answer "because it's fun," but their desire reflects motivations that are even more compelling than fun.

Maybe the work itself is dirty, tiresome, stressful drudgery. Nobody would call it fun. But all the elements listed above—collaboration, autonomy, camaraderie, being needed, being recognized as doing important work, belonging and pursuing one's goals—these are the essentials of human life.

But work can be even more than all these essentials. It is *the opportunity to contribute, learn and excel*.

The rewards of such a workplace are not replaceable by leisure and conventional amusements. Being paid to do nothing but consume (i.e. guaranteed minimum income) offers none of these opportunities. Being paid to do nothing is a wasteland of behavioral sinks and lost opportunities to gain the essentials of human life.

No serious economist ponders whether work should be meaningful (or dare we say it—fun). That the core of human life doesn't even register in conventional economics reflects the monumental failure not just of economics but of the conventional narrative.

Work that has been stripped of autonomy, ownership and positive social roles is neither meaningful nor fun. Centralized hierarchies strip away autonomy, meaning, ownership and positive social roles because *that is the only possible output of such systems*.

Why do we tolerate meaningless, unrewarding and unfulfilling work?

For this reason: paid work is scarce. We have to take whatever jobs are being offered by profit-maximizing enterprises or the state that depends on those enterprises for its tax revenues.

And why is paid work scarce? Because money is scarce. If every community could create money by producing goods and services that filled local needs regardless of profit, and do so without having to borrow the money into existence from banks, money would not be scarce. Then paid work would not be scarce, either, because the community could pay everyone fulfilling the community’s needs, i.e. those actually improving the world.

If the system that generated the money required decentralized, democratized workplaces and freedom of movement between workplaces, that system’s only possible output would be the features listed above that make work meaningful, rewarding and, dare I say it again—*fun*.

The Future Belongs to Work That Is Meaningful

There may be a perfect word for everything beyond a wage that makes people want to come to work, but I confess I can’t find it. I have described the elements of work that is purposeful, meaningful and fulfilling: autonomy, ownership, positive social roles, building capital, opportunities to contribute, learn and excel. Condensing this to *meaningful work* expresses our profound need for purpose, pride, dignity, belonging, contributing, participating, collaborating and learning, but it still doesn’t capture the joys of work.

In the conventional narrative, work and fun are mutually exclusive. Work is onerous, difficult, boring, unpleasant, and stressful, while fun is partying, shopping, playing games and being entertained.

Saying that work should be fun makes a mockery of its difficulties, and trivializes its many rewards. But discussing work without discussing its potential for joy is to miss an important part of what could and should be.

As an experiment, let’s list features of work that are rewarding and even enjoyable, and those that are not.

FUN:	NOT FUN
Being productive	Being unproductive
Work with purpose	Work without purpose
Work organized so employees are productive and fulfilled	Work organized to impose hierarchy and control
Autonomy and collaboration	Passively taking orders
Having a say	Having no say
Being threatened with a loss of your livelihood	Being able to choose a different employer/work
Having control of your work	Doing work over which you have no control

I'm sure you get the idea!

In a system in which paid work is abundant, the future belongs to work that is meaningful, and at times, yes, fun, if we define fun as *everything beyond money that makes a person want to go to work*.

These dynamics are often not immediately visible, even to those doing the work.

A recent account (on hardscrabblefarmer.com) about a young man's summer job on a farm expresses this quality of meaningful work. The young man had spent months driving hundreds of cedar fence posts with a sledgehammer. Few would describe this work as fun; most would describe it as hard, tiring, boring, and so on.

The young man had gone on to college, and recently returned to tell the farmer that the days he'd spent working on the farm were some of the best days of his life, and that he'd come to understand their importance in his life.

To those of us with similar experiences, the reasons why the young man valued this work experience so highly are self-evident: he had done good work that was sincerely appreciated. The work had been hard and repetitive but it was purposeful and something he could be proud of. He could see and touch the results of his work. He hadn't learned a trade so much as learned the value of meaningful work.

A system that doesn't offer this opportunity to everyone is a failed system. Paying people to do nothing but while away their lives as passive consumers is a failed system.

In Section Two, I lay out a system that offers meaningful paid work for all who want it.

[Money Creation/Distribution Is Integral to Meaningful Work and Widespread Wealth Creation](#)

The point of all these questions is now clear: the way that money is created and distributed is absolutely integral to the creation of meaningful work and broad-based wealth creation, i.e. *ownership of the output* and *creating human and social capital*.

In the conventional narrative, the creation and distribution of money is completely separate from the creation of jobs and work. Rather than aid widespread wealth creation, the current system of money creation actively widens wealth and income disparity because *this is the only possible output of the system*.

It's clear that the way we create and distribute money is key to generating an abundance of work that meets the needs of the larger community.

In Section Two, I sketch out a system whose only possible output is an abundance of paid work that encourages autonomy, meaning, ownership and positive social roles rather than stripping them away.

But before we can take that step, we need to understand systems, and why their design and inputs dictate their outputs.