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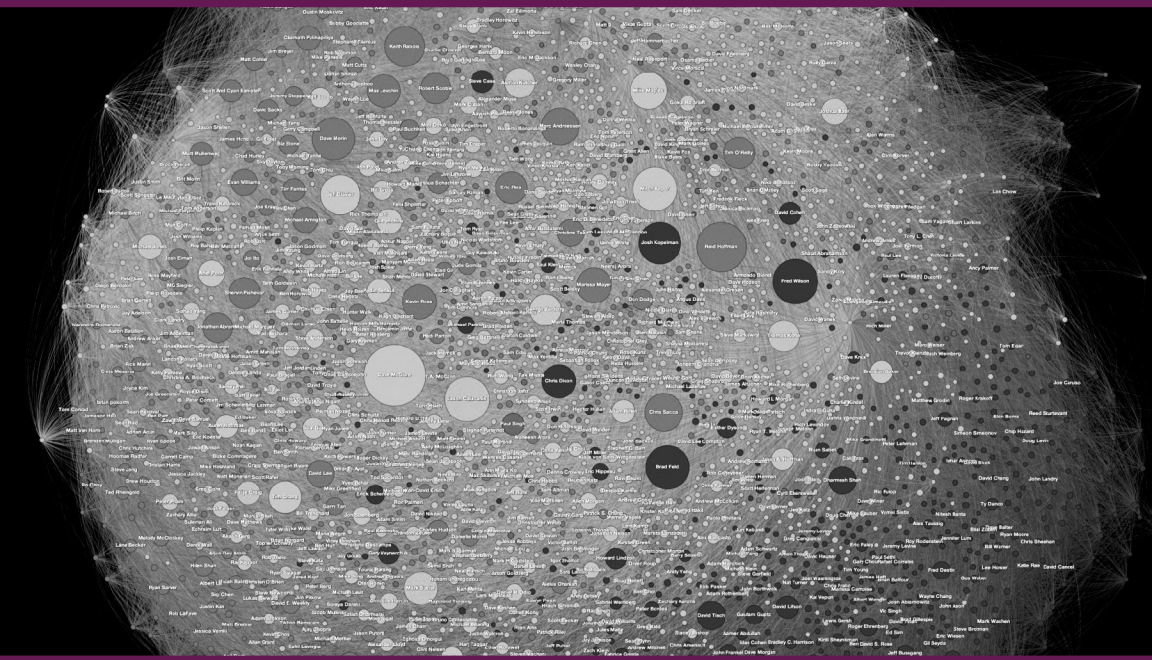
# What's the Future of Work?

## Exploring the Economic Shift Led by Software and Connectedness



Tim O'Reilly

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## *Exploring the Economic Shift Led by Software and Connectedness*

*Tim O'Reilly*

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**What's the Future of Work?**
by Tim O'Reilly



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CHAPTER 1

# The WTF Economy Is Transforming How We Do Business

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

WTF?! In San Francisco, Uber has three times the revenue of the entire prior taxi and limousine industry.

WTF?! Without owning a single room, Airbnb has more rooms on offer than some of the largest hotel groups in the world. Airbnb has 800 employees, while Hilton has 152,000.

WTF?! Top Kickstarters raise tens of millions of dollars from tens of thousands of individual backers, amounts of capital that once required top-tier investment firms.

WTF?! What happens to all those Uber drivers when the cars start driving themselves? AIs are flying planes, driving cars, advising doctors on the best treatments, writing sports and financial news, and telling us all, in real time, the fastest way to get to work. They are also telling human workers when to show up and when to go home, based on real-time measurement of demand. The algorithm is the new shift boss.

WTF?! A fabled union organizer gives up on collective bargaining and instead teams up with a successful high tech entrepreneur and investor to go straight to the people with a local $15 minimum wage initiative that is soon copied around the country, outflanking a gridlocked political establishment in Washington.

What do on-demand services, AI, and the $15 minimum wage movement have in common? They are telling us, loud and clear, that we're in for massive changes in work, business, and the economy.

What is the future when more and more work can be done by intelligent machines instead of people, or only done by people in partnership with those machines? What happens to workers, and what happens to the companies that depend on their purchasing power? What's the future of business when technology-enabled networks and marketplaces are better at deploying talent than traditional companies? What's the future of education when on-demand learning outperforms traditional universities in keeping skills up to date?

Over the past few decades, the digital revolution has transformed the world of media, upending centuries-old companies and business models. Now, it is restructuring every business, every job, and every sector of society. No company, no job is immune to disruption.

I believe that the biggest changes are still ahead, and that every industry and every organization will have to transform itself in the next few years, in multiple ways, or fade away. We need to ask ourselves whether the fundamental social safety nets of the developed world will survive the transition, and more importantly, what we will replace them with.

We need a focused, high-level conversation about the deep ways in which computers and their ilk are transforming how we do business, how we work, and how we live. Just about everyone's asking WTF? ("What the F***?" but also, more charitably, "What's the future?")

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CHAPTER 2

# The Rise of Networked Platforms for Physical World Services

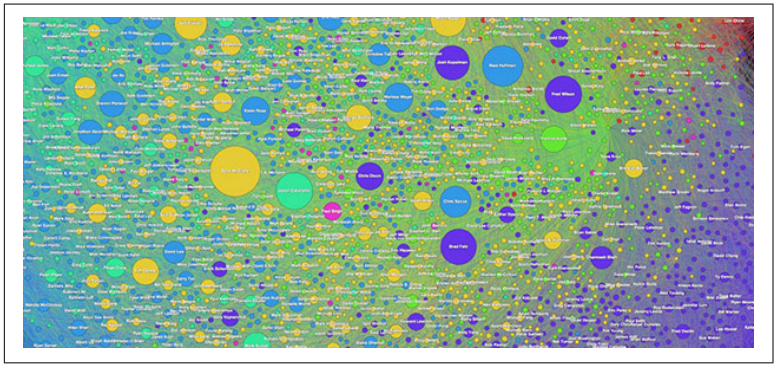

*Figure 2-1.*

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

One of the themes we're exploring in our Next Economy thinking is the way that networks trump traditional forms of corporate organization, and how they are changing traditional ways of managing that organization. Uber and Airbnb are textbook examples of this trend. Uber has ambitious plans to manage hundreds of thousands—eventually even millions—of independent drivers with a small core of employees building a technology platform that manages those workers. Airbnb is on track to have more rooms on offer than large hotel chains, with under a thousand employees.

Esko Kilpi beautifully described the power of networks in an essay on Medium, *The Future of Firms,* reflecting on economist Ronald Coase's theory of 20th century business organization. He wrote:

> The existence of high transaction costs outside firms led to the emergence of the firm as we know it, and management as we know it. … The reverse side of Coase's argument is as important: if the (transaction) costs of exchanging value in the society at large go down drastically, as is happening today, the form and logic of economic and organizational entities necessarily need to change! The core firm should now be small and agile, with a large network.
>
> The mainstream firm, as we have known it, becomes the more expensive alternative. This is something that Ronald Coase did not see coming. Accordingly, a very different kind of management is needed when coordination can be performed without intermediaries with the help of new technologies. **Apps can do now what managers used to do.**[Bolding mine.]
>
> Today, we stand on the threshold of an economy where the familiar economic entities are becoming increasingly irrelevant. The Internet and new Internet-based firms, rather than the traditional organizations, are becoming the most efficient means to create and exchange value.

Of course, networks have always been a part of business. An automaker is not made up of just its industrial workers and its managers, but also of its network of parts suppliers and auto dealerships and ad agencies. Even its shareholders are a network that supports its capital needs. Similarly, large retailers are aggregation points for a network of suppliers, logistics companies, and other suppliers. Fast food vendors like McDonalds and Subway aggregate a network of franchisees. The entire film and TV industry consists of a small core of full-time workers and a large network of temporary on-demand workers. This is also true of publishing and other media companies. My own company, O'Reilly Media, publishes books, puts on events, and delivers online learning with a full-time staff of 500 and an extended family of tens of thousands of contributors—authors, conference presenters, technology advisers, and other partners.

But the Internet takes the networked firm to a new level. Google, the company that ended up as the prime gateway to the World Wide Web, provides access to a universe of content that it doesn't own, yet it has become the largest media company in the world. 13- to 24-year-olds already watch more video on YouTube, much of it user-contributed, than they watch on television. And Amazon just

surpassed Walmart as the world's most valuable retailer by offering virtually unlimited selection, including marketplace items from ordinary individuals and small businesses.

On-demand companies like Uber and Airbnb are only the latest development in an ongoing transformation of business by the Internet. In addition to discussing these latest entrants, we'll take a look at what we learn from the evolution of Internet e-commerce and content marketplaces. Then we'll try to tease out some best practices of Internet-era platforms and marketplaces.

## The Evolution of Platforms

Consider the evolution of the retail marketplace as exemplified first by chain stores, and then by Internet retailers like Amazon, which have largely replaced a network of small local businesses that delivered goods through retail storefronts. Cost efficiencies led to lower prices and greater selection, drawing more consumers, which in turn gave more purchasing power to larger retailers, allowing them to lower prices further and to crush rivals in a self-reinforcing cycle. National marketing of these advantages led to the rise of familiar chains.

But the Internet added even more leverage, reducing the need to invest in real estate, reaching customers who were not physically close to prime locations, and building in new habits of customer loyalty and instant gratification. With delivery now same day in many locations, anything you need is only a few clicks away.

Internet retailers like Amazon were also able to offer even larger selections of products, aggregating offerings not just from a carefully chosen network of suppliers, but opening up self-service marketplaces in which anyone could offer products. Years ago, Clay Shirky described the move from "filter, then publish" to "publish, then filter" as one of the key advantages brought by the Internet to publishing, but the lesson applies to virtually every Internet marketplace. It is fundamentally an open-ended network in which filtering and curation (otherwise known as "management") happens largely after the fact.

But that's not all. While large physical retailers cut costs by eliminating knowledgeable workers, using lower prices and greater selection to hedge against worse customer service (compare an old-time

hardware store with a chain like Home Depot or Lowe's), *online retailers did not make these same tradeoffs*. Instead of eliminating knowledgeable workers, they replaced them with software.

Even though there are several orders of magnitude more products than in physical stores, you don't need a salesperson to help you find the right product on Amazon—a search engine helps you find it. You don't need a salesperson to help you understand which product is the best—Amazon has built software that lets customers rate the products and write reviews to tell you which are best, and then feeds that reputation information into their search engine so that the best products naturally come out on top. You don't need a cashier to help you check out—software lets you do that yourself.

### New Workers in the Network

The greater labor efficiency of the online model can be seen by comparing the revenue per employee of Amazon vs. Walmart. Walmart, already the most efficient retailer, employs 2.2 million people to achieve its $482 billion in sales, or approximately $219,000 per employee. Amazon employs 150,000 people to achieve $89 billion in sales, or approximately $593,000 per employee. It's easy to focus on the jobs that were eliminated by software in a company like Amazon. The jobs that were created are often harder to see because they are in the network, not just in the core:

- New workers at small suppliers who were previously unable to bring products effectively to market.
- New workers in jobs like package delivery, as the customer who used to pick up his or her own goods now has them delivered to the home or office. (Most ecommerce businesses replace retail workers with software-enabled self-service; in this one aspect, ecommerce businesses replace customer self-service with workers.)
- New workers in warehouses that no longer handle periodic large shipments to local retailers, but instead provide atomized same- or next-day delivery to millions of customers.
- New workers at telecom companies, Internet service providers, data centers, energy companies, and other suppliers to the invisible infrastructure of the Internet that is replacing the more visible infrastructure of bricks and mortar.

The workers in the core build and maintain the software at the heart of the networked platform. This software doesn't just get writ-

ten and left to run on its own: it is constantly updated and managed by a set of workers who are constantly tuning the machine to make it more effective.

One of the key social and economic questions that needs to be asked is whether network businesses (and other technology businesses) inevitably produce only a small core of high-paying jobs and a much larger network of lower-wage jobs, or whether this is the result of management choices and social policy.

## Networked Platforms for Physical World Services

One way to think about the new generation of on-demand companies, such as Uber, Lyft, and Airbnb, is that they are networked platforms for physical world services, which are bringing fragmented industries into the 21st century in the same way that ecommerce has transformed retail.

Let's start by taking a closer look at the industry in which Uber and Lyft operate.

The coordination costs of the taxicab business have generally kept it local. According to the Taxicab, Limousine, and ParaTransit Association (TLPA), the US taxi industry consists of approximately 6,300 companies operating 171,000 taxicabs and other vehicles. More than 80% of these are small companies operating anywhere between 1 and 50 taxis. Only 6% of these companies have more than 100 taxicabs. Only in the largest of these companies do multiple drivers use the same taxicab, with regular shifts. 85% of taxi and limousine drivers are independent contractors. In many cases, the taxi driver pays a rental fee (typically $120/$130 per day) to the owner of the cab (who in turn pays a dispatch and branding fee to the branded dispatch service) and keeps what he or she makes after paying that daily cost. The total number of cabs is limited by government-granted licenses, sometimes called medallions.

When you as a customer see a branded taxicab, you are seeing the brand not of the medallion owner (who may be a small business of as little as a single cab), but of the dispatch company. Depending on the size of the city, that brand may be sublicensed to dozens or even hundreds of smaller companies. This fragmented industry provides

work not just for drivers, but for managers, dispatchers, maintenance workers, and bookkeepers. The TLPA estimates that the industry employs a total of 350,000 people, which works out to approximately two jobs per taxicab. Since relatively few taxicabs are "double shifted" (these are often in the largest, densest locations, where it makes sense for the companies to own the cab and hire the driver as a full-time employee), that suggests that half of those employed in the industry are in secondary support roles. These are the jobs that are being replaced by the efficient new platforms. Functions like auto maintenance still have to be performed, so those jobs remain. Jobs that are lost to automation are equivalent to the kinds of losses that came to bank tellers and their managers with the introduction of the ATM.

Technology is leading to a fundamental restructuring of the taxi and limousine industry from one of a network of small firms to a network of individuals, replacing many middlemen in the taxi business with software, using the freed-up resources to put more drivers on the road.

Uber and Lyft use algorithms, GPS, and smartphone apps to coordinate driver and passenger. The extraordinary soon becomes commonplace, so we forget how our first ride was a magical user experience. That magic can lead us to overlook the fact that, at bottom, Uber and Lyft provide dispatch and branding services much like existing taxi companies, only more efficiently. And like the existing taxi industry, they essentially subcontract the job of transport—except in this case, they subcontract to individuals rather than to smaller businesses, and take a percentage of the revenue rather than charging a daily rental fee for the use of a branded taxicab.

These firms use technology to eliminate the jobs of what used to be an enormous hierarchy of managers (or a hierarchy of individual firms acting as suppliers), replacing them with a relatively flat network managed by algorithms, network-based reputation systems, and marketplace dynamics. These firms also rely on their network of customers to police the quality of their service. Lyft even uses its network of top-rated drivers to onboard new drivers, outsourcing what once was a crucial function of management.

It's useful to call out some specific features of the new model:

- GPS and automated dispatch technology inherently increase the supply of workers, because they make it possible for even part-time workers to be successful at finding passengers and navigating even to out-of-the-way locations. There was formerly an "experience premium," whereby experienced drivers knew the best way to reach a given destination or to avoid traffic. Now, anyone equipped with a smartphone and the right applications has that same ability. "The Knowledge," the test required to become a London taxi driver, is famously one of the most difficult exams in the world. The Knowledge is no longer required; it has been outsourced to an app. An Uber or Lyft driver is thus an "augmented worker."
- The reliability and ease of use of Uber and Lyft makes it much easier for passengers to get pickups in locations where taxis do not normally go, and at times when taxis are unavailable. This predictability of supply not only satisfies unmet demand, but leads to increased demand. People are now more likely to travel more widely around the city, whereas before they might have avoided trips where transportation was hard to find. There are other ancillary benefits, such as the ability for passengers to be picked up regardless of race, and for some previously unemployable populations (such as the deaf) to serve as drivers.
- Unlike taxis, which must be on the road full time to earn enough to cover the driver's daily rental fee, the "pay as you go" model allows many more drivers to work part time, leading to an ebb and flow of supply that more naturally matches demand. Drivers provide their own vehicles, earning additional income from a resource they have already paid for that is often idle, or allowing them to help pay for a resource which they are then able to use in other parts of their life. (Obviously, they incur additional costs as well, but these costs are generally less than the costs of daily taxi rental. There are many other labor issues as well; these will be the subject of a later essay.)
- Unlike taxis, which create an artificial scarcity by issuing a limited number of medallions, Uber uses market mechanisms to find the optimum number of drivers, with an algorithm that raises prices if there are not enough drivers on the road in a particular location or at a particular time. While customers initially complained, this is almost a textbook definition of a Supply and Demand Graph, which uses market forces to balance the competing desires of buyers and sellers.

- More drivers means better availability for customers, and shorter wait times. Uber is betting that this will, in turn, lead to changes in consumer behavior, as more predictable access to low-cost transit causes more people to leave their personal car at home and use the service more. This, in turn, will allow the service to lower prices even further, which will increase demand in a virtuous circle. This is the same pattern that has driven American business since the Great Atlantic & Pacific Tea Company (A&P) pioneered the model in the early part of the 20th century.
- There are concerns about whether lowering prices affects driver income. So far, there are many accusations from critics but no hard evidence that this is the case. Uber argues that greater demand will actually increase driver income. In any case, Uber is now putting its money where its mouth is and guaranteeing driver income when it lowers fares.
- There are also concerns about the impact of Uber and Lyft on urban congestion. But the data on the subject is equivocal. And while the current algorithm is optimized to create shorter wait times, there is no reason it couldn't take into account other factors that improve customer satisfaction and lower cost, such as the impact of too many drivers on congestion and wait time. Algorithmic dispatch and routing is in its early stages; to think otherwise is to believe that the evolution of Google search ended in 1998 with the invention of PageRank.
- A crowdsourced rating system is far from perfect, but it delivers visibly better and more consistent results than whatever management processes were performed by traditional taxi companies.
- There is no absolute requirement that drivers be individuals, and the supplier networks to these platforms will continue to evolve.

## The Franchise of One

In my initial post, The WTF Economy, I wrote:

> WTF?! Without owning a single room, Airbnb has more rooms on offer than some of the largest hotel groups in the world. Airbnb has 800 employees, while Hilton has 152,000.

It would have lacked the immediate punch, but I could also have written:

> WTF?! Without owning a single restaurant, Subway has more fast food restaurants than McDonald's. Subway has 900 employees. McDonald's has 420,000.

The reason: Subway owns no restaurants, while McDonald's owns 20% of its restaurants, with the remaining 80% franchised. (Employment across both owned and franchised restaurants at McDonald's is more than 1.9 million.)

In many ways, Uber and Airbnb represent a 21st-century update of the franchising model. In franchising, the parent company brands and markets the product, sets standards for producing it, and charges a licensing fee and receives a percentage of revenue from each of its franchisees.

The difference is that technology radically lowers the barriers to being a franchisee. In many ways, you can call the modern trend "the franchise of one." The smallest unit of franchising in the past was a small business, with all the overhead that implies: real estate, equipment, uniforms, employees (including managers), and so on. Today, the franchise can be a single individual, and that individual can work only part time, so it's really "the franchise of one or even less!"

Branding and advertising are much less necessary because the app itself becomes a customer habit that delivers business. There are little or no capital requirements, workers can schedule their own time, and turn their own under-utilized personal assets (a car, a house, or other equipment) into business assets. In her book *Peers Inc*, Robin Chase refers to this as "excess capacity."

This is exactly the dynamic that Kilpi references when he describes how the radically lower transaction costs of networks give them advantages over traditional firms.

Though the details of the taxi industry differ from the hotel industry, the same dynamic applies to another great success story of the on-demand economy: Airbnb. Like Uber and Lyft, Airbnb uses technology to make excess capacity available in locations that were otherwise extremely poorly served. Even in great cities, hotels are available only in some neighborhoods, and completely unavailable

in others. By contrast, Airbnbs can be found anywhere that there is demand.

A small personal anecdote: I recently got married in Fort Tryon Park in New York City, near the Cloisters. The nearest hotel is 1.5 miles away, and the closest "nice" hotel is 3.8 miles, yet my fiance and I were able to walk to our wedding site from a beautiful, comfortable Airbnb facing the park and just five minutes away. Many of our guests stayed locally as well.

As with Uber and Lyft, we see that the granular nature of supply (the franchise of one, or even less than one) makes it easy for more natural market mechanisms to come into play. People can offer a resource that they already own, testing the market to see if there is demand and at what price. If they are satisfied with the transaction, they can continue to offer that resource. More supply will come on stream to match demand in highly desirable locations.

There are some interesting lessons, though, about the evolution of the supply network. While Airbnb began as a network of properties offered solely by individuals, already 40% of Airbnb properties are now offered by hosts who own more than one property. There are also anecdotal reports that small companies owning multiple cars are starting to be part of the Uber network.

## From Decentralization to Recentralization

The evolution of Airbnb's network echoes the evolution of the World Wide Web and the media platform businesses that grew up on it, such as Yahoo, Google, YouTube, and Facebook.

The World Wide Web began as a peer-to-peer network of individuals who were both providing and consuming content. Yet 25 years on, the World Wide Web is dominated by the media presence of large companies, though there is still plenty of room for individuals, mid-sized companies, and aggregators of smaller companies and individuals. While the platform itself began in decentralized fashion, its growth in complexity led to increasing centralization of power. Everyone started out with an equal chance at visibility, but over time, mechanisms were invented to navigate the complexity: first directories, then search engines.

Eventually, there grew up a rich ecosystem of intermediaries, including, at the top of the food chain, first Yahoo! then Google and their

various competitors, but also content aggregators of various sizes and types, such as the Huffington Post and Buzzfeed, as well as various companies, from Search Engine Optimizers to advertising firms like DoubleClick and Aquantive, and content delivery firms like Akamai and Fastly, who help other firms optimize their performance in the marketplace.

Later media networks such as YouTube, Facebook, and the Apple App Store bypassed this evolution and began as centralized portals, but even there, you see some of the same elements. In each case, the marketplace was at first supplied by small individual contributors, but eventually, larger players—companies, brands, and superstars—come to dominate.

In addition, the central player begins by feeding its network of suppliers, but eventually begins to compete with it. In its early years, Google provided no content of its own, simply sending customers off to the best independent websites. But over time, more and more types of content are offered directly by Google. Amazon began simply as a marketplace for publishers; eventually, they became a publisher. Over time, as networks reach monopoly or near-monopoly status, they must wrestle with the issue of how to create more value than they capture—how much value to take out of the ecosystem, versus how much they must leave for other players in order for the marketplace to continue to thrive.

I believe we will see some of these same dynamics play out in the new networked platforms for physical world services, such as Uber, Lyft, and Airbnb. Successful individuals build small companies, and some of the small companies turn into big ones. Eventually, existing companies join the platform. By this logic, I expect to see large hotel chains offering rooms on Airbnb, and existing taxi companies affiliating with Uber and Lyft. To optimize their success, these platforms will need to make it possible for many kinds of participants in the marketplace to succeed.

## Key Lessons

Here are some key lessons for companies wanting to emulate the success of Internet marketplaces like Amazon, Google, Uber, and Airbnb:

- Lower transaction costs are what drive the evolution of the market from traditional firms to large networks. Therefore, focus relentlessly on lowering barriers to entry for both suppliers (workers) and customers.
- Networks aggregate customers very effectively, reducing the number of other companies that sell directly to those customers, thus leading to industry consolidation. As Jeff Bezos famously said, "[Their] margin is my opportunity." Look, therefore, for fragmented markets where technology allows you to create new economies of scale.
- The lower costs of doing business at scale make it possible to offer products to the market at lower prices, increasing demand. Be sure to pass savings on to the customer. Given sufficient investment, you can scale more quickly by passing on the savings even before you get to scale. Jeff Bezos was able to convince the market of this proposition, enduring years of losses or very low margins, even as a public company, in order to reach massive scale. Uber appears to be following the same playbook.
- That being said, use market mechanisms and data to innovate on pricing. Google famously revolutionized advertising by creating an auction system that favors the most effective advertisements rather than the highest bidder. I expect similar business model innovations in the on-demand space, as the power of big data makes it possible to make a real-time market in various kinds of services.
- Networked platforms serve customers who were previously hard to reach, thus increasing the total number of customers. Therefore, don't just skim the cream. Build mechanisms to extend your network to underserved populations, creating new markets. Many of the second-tier on-demand companies are doomed to fail because they only target small populations of affluent consumers, rather than finding a path in which the virtuous circle of scale and lower cost eventually allows them to serve a much broader market.
- Networks aggregate suppliers very effectively, increasing both the total number of available products and the total number of suppliers. Suppliers range from single individuals offering a single product to huge firms, with many levels of smaller firms, and also intermediaries who aggregate those smaller firms. Therefore, build in mechanisms that will support suppliers of all sizes. (Note to policy makers considering the employment status

of on-demand workers: suppliers to on-demand platforms will eventually include companies of many sizes, not just individuals.)

- When you open the market to an unlimited number of suppliers, you must invest in reputation systems, search algorithms, and other mechanisms that help bring the best to the top. Simple, easily gamed reputation systems are table stakes; over time, more sophisticated curation will be necessary.
- Internet-era networks don't just seek to eliminate workers; they seek to augment them. Invest in software that empowers your workers, allowing them to multiply their effectiveness and to create magical new user experiences for customers.

*Cropped image on article: Visualization of the AngelList network by Dave Troy (@davetroy). Copyright 2014 by 410 Networks. Used with permission. Editor's note: this post was first published on Medium; it is republished here with permission.*

CHAPTER 3

# A World of Continuous Partial Employment


*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

**Our future workplaces are increasingly managed by apps and algorithms. Is technology empowering workers, or making them ever more helpless cogs in a corporate profit machine?**

When we talk about the "on-demand economy," we are really talking about two things: the ability of a consumer to summon a vehicle, their lunch, or their groceries with the touch of an app or a few words to Siri, Cortana, or Google Now; and the lives of the workers

who respond to those summons. Instant on-demand consumer services mean workers must also be available on demand.

As Logan Green of Lyft noted, his company provides "transportation as a service." Perhaps the more general point is that it provides *labor* as a service. At least for now, the car comes with a driver.

Companies such as Lyft, Uber, TaskRabbit, Postmates, Upwork (and too many other new startups to count) all depend on a large pool of workers who make no set work commitments, who are bound to no schedule, but simply turn on an app when they want to work, and compete with other workers for whatever jobs are available.

These apps have gotten a lot of attention. But focusing that attention merely on "Next Economy companies" misses many of the deeper changes in the labor economy.

Traditional companies have also always had a need to manage uneven labor demand. In the past, they did this by retaining a stable core of full-time workers to meet base demand, and an expanded group of part-time contingent workers or subcontractors to meet peak demand.

But in today's world, this has given way to a kind of **continuous partial employment for most low wage workers** at large companies, where sophisticated workplace scheduling software lets companies build larger-than-needed on-demand labor pools to meet peak demand, and then parcel out the work in short shifts and in such a way that no one gets full-time hours.

As Esther Kaplan of The Investigative Fund points out in her *Harper's* article "The Spy Who Fired Me," this design pattern has become the dominant strategy for managing low-wage workers in America.

> A 2010 management survey led by Susan Lambert of the University of Chicago found that 62 percent of retail jobs are now part-time and that two thirds of retail managers prefer to maintain a large workforce, to maximize scheduling flexibility, rather than increase hours for individual workers. In 2012, a study of retail workers conducted by the Retail Action Project and Stephanie Luce of the City University of New York found that unstable scheduling, with radical changes from week to week, was common, as was extremely short notice. Only 17 percent of surveyed workers—and just 10 percent of those who were part-time—had a set schedule; only 30 percent received their schedule more than a week in advance.

> Schedules often had set start times, but many shifts ended abruptly as soon as business declined. One in five workers had to keep her schedule free for "call-in" shifts that rarely materialized. An employee at Club Monaco told researchers that if sales weren't high enough, managers would give workers a single guaranteed shift each week—plus four on-call shifts. A third of the employees in the study had dependent children and were forced, like Santana, to piece together child care to cover their increasingly erratic working lives.
>
> Most low-wage workers juggle two to three jobs just to get by, said Allen Mayne, director of collective bargaining at R.W.D.S.U., a retail workers' union that helped found the Retail Action Project. But it's almost impossible to get a second job if you've already promised away a claim on each of your waking hours. I asked Mayne whether an employee could get fired for missing a shift that she was given at the last minute. 'In a nonunion environment?' he said. 'Oh, yeah. Fine. See you.'
>
> *—Esther Kaplan, from "The Spy Who Fired Me"*

Both traditional companies and Next Economy companies use apps and algorithms to manage workers. But there's an important difference. Companies using the top-down scheduling approach adopted by traditional low-wage employers demonstrate the wrong way to use technology to manage variable workloads: pervasive workplace monitoring, algorithmic shift assignment with minimal affordances for worker input, and programmed limits on hours that limit employees to part-time work to avoid triggering expensive health benefits.

By contrast, I think there's a lot to learn from the Next Economy strategy of exposing data to the workers, not just the managers, letting them know about the timing and location of demand, and letting them choose when and how much they want to work. This gives the worker agency, and uses market mechanisms to get more workers available at periods of peak demand or at times or places where capacity is not normally available.

**There are two different approaches to using technology to manage labor. One provides data and control solely to managers, disempowering workers and minimizing their costs to improve company profits; the other offers data to both managers and workers, giving workers agency, the freedom to work when and how much they want.**

There have been many arguments that workers for Next Economy on-demand companies should be treated as employees, not as independent contractors. I won't speak to the complex labor regulations used to make these determinations, but I do want to ask a question that should concern anyone who wants to actually improve the lives of workers rather than simply make sure that regulations are enforced.

Which of these scenarios sounds better to you?

> Our workers are employees. We used to hire them for eight hour shifts. But we are now much smarter, and are able to lower our labor costs by keeping a large pool of part time workers, predicting peak demand in 15 minute increments, and scheduling workers in short shifts. Because demand fluctuates, we keep workers on call, and only pay them if they are actually needed. What's more, our smart scheduling software makes it possible to make sure that no worker gets more than 29 hours, to avoid triggering the need for expensive full-time benefits.

Or:

> Our workers are independent contractors. We provide them tools to understand when and where there is demand for their services, and when there aren't enough of them to meet demand, we pay them more (and charge customers more) until supply and demand are in balance. They can work as much or as little as they want until they meet their income goals. They are competing with other workers, but we do as much as possible to maximize the size of the market for their services.

The first of these scenarios summarizes what it's like to work for an employer like Walmart, McDonalds, The Gap, or even a progressive low-wage employer like Starbucks. Complaints from workers include lack of control over schedule even in case of emergencies, short notice of when they are expected to work, unreasonable schedules known as "clopens" (e.g., the same worker being required to close the store at 11 pm, and open it again at 4 am the next day—a practice that Starbucks banned in mid-2014), "not enough hours", and a host of other labor woes.

The second scenario summarizes the labor practices of Uber, the largest and most controversial of the new breed of "on demand" companies coming out of Silicon Valley. Talk to many drivers, as I have, and they tell you that they love the freedom the job provides to set their own schedule, and to work as little or as much as they want. (This is borne out by a study of Uber drivers by economists Alan

Kruger of Princeton and Jonathan Hall (now chief economist at Uber). 51% of Uber drivers work less than 15 hours a week, to generate supplemental income. Others report working until they reach their target income. 73% say they would rather have "a job where you choose your own schedule and be your own boss" than "a steady 9-to-5 job with some benefits and a set salary.")

**If "the algorithm is the new shift boss," the business rules driving the algorithm, and whether it increases or decreases the opportunities offered to workers, make a huge difference!**

We need to recognize that yes, these are contingent jobs, without a safety net, and that while these platforms may be great for part-time workers looking for supplemental or transitional income, they provide something very far from the kind of long-term stability that constitute what we would call "a good job." And yes, there are Uber drivers who want a greater voice to set rates and rules. Right now they don't have any way to bargain over the conditions of their services.

But we also need to recognize that traditional jobs today have much the same problem.

In an interview with Lauren Smiley, Secretary of Labor Tom Perez acknowledged the risks, and highlighted that the real issue is whether or not workers make a living wage:

> When I hear about "the gig economy," implicit in that for some is a sense that this is the first time people work from gig to gig. That's just not right. You look at homecare workers and domestic workers and so many other low wage workers who have been surviving, oftentimes barely … people have been working from gig to gig for quite some time. We need to make sure people working gig to gig can make a living.

However, there are many (including, in ambiguous guidance, the US Department of Labor) who urge that on-demand companies be required to treat their workers as employees, not independent contractors.

There are many reasons why this is not the right answer to the fundamental goal that Secretary Perez set forth.

On first blush, it would seem that being an employee has many benefits. In the US, the largest are that you are eligible for unemployment benefits, and that you have half your social security and

Medicare tax paid for by the employer—a full 7.65% of your pay. You may have paid holidays and paid vacation. And if you injure yourself on the job, worker's compensation insurance can make the difference between being on the street and continuing to get by.

But there are some big issues that no one seems to talk about. There is a huge gulf between the benefits often provided to full-time employees and part-time employees. And that has led to what I call "the 29 hour loophole." Unscrupulous managers can set the business rules for the automated scheduling software used by most large low-wage employers to make sure that no worker gets more than 29 hours in a given week. Because employment law allows different classes of benefits for part-time and full-time workers, this allows core staff at the company to be given generous benefits, while the low-wage contingent workers get the bare-bones version.

Once you realize this, you understand the potentially damaging effect of the Department of Labor guidance not just for new Silicon Valley companies but also for their workers. Turn on-demand workers from 1099 contractors into W2 employees, and the most likely outcome is that the workers go from having the opportunity to work as much as they like for a platform like Uber or TaskRabbit to one in which they are kept from working more than 29 hours a week! This was in fact exactly what happened when Instacart converted its on-demand workers to employees. *They became part-time employees*.

(Even before the advent of computerized shift scheduling software, companies played shell games with employee pay and benefits. I remember student protests at Harvard in 2000 focused on the unfair treatment of janitors and other maintenance personnel. "You're not a full-time employee," janitors were told. "You don't work 40 hours for Harvard University. You work 20 hours for Harvard College, and 20 hours for the Harvard Law School.")

Perhaps as pernicious as the fact that companies limit workers to 29 hours a week, the capricious nature of many of the schedules that are provided by traditional low-wage employers and the lack of visibility into future working hours means that workers can't effectively schedule hours for a second job. They can't plan their lives, their child care, a short vacation, or even know if they will be able to be present for their children's birthdays.

By contrast, independent contractors for on-demand services can work as many hours as they like—many report working until they

reach their desired income for the week, rather than some set number of hours—and equally importantly, they work when they want. Many report that the flexibility to take time off to deal with childcare, or health issues, or legal issues, are the most important part of what they like about the job. (That being said, if you are an on-demand worker, not all hours are equal. Schedules that allow workers to maximize their income are, to a large extent, still driven by marketplace demands.)

In the case of Uber, Lyft, and other transportation services, the call for workers to be treated as employees is particularly lacking in context.

Eighty-eight percent of taxi drivers in the US are independent contractors; most pay a rental fee of up to $125/day to the taxi owner, and only start to make money once they have paid off that fee each day. That is a far larger amount than the cost of car payments and insurance that most Uber and Lyft drivers pay. The taxi owner is usually responsible for maintenance of the vehicle, but the driver is responsible for daily expenses like gas. Why don't taxi drivers desert their current employers in droves? While most medallions (the city- or county-granted right to operate a taxi) are owned by companies, there are individual drivers who have worked for years to amass the capital to buy their own medallion. But as is so often the case in low-wage jobs, so many are forced to pay higher costs because they lack the capital to pay less.

This isn't to say that there aren't serious problems with the independent contractor model for low-wage workers. Independent contractors are responsible for their own tax payments, and many, being unsophisticated, think of their weekly check from Uber, Lyft, or TaskRabbit as being theirs to spend. They don't make quarterly tax payments, and many of them find themselves unable to pay their taxes due when April 15 rolls around.

However, there are some offsetting benefits. As independent contractors (small businesses), they are allowed to deduct 57.5 cents per mile driven in their own vehicle. Intuit even provides an app, integrated with the Uber app, to help a driver track personal miles driven versus miles driven on the job. For a driver putting on hundreds of miles per week, this may shelter a large part of his or her income from taxes.

Even the notion that being an employee results in benefits such as paid holiday and vacation isn't quite what it appears. When an employee "accrues vacation, holiday, or sick days" this isn't a gift from the employer. It is fundamentally an escrow of the employee's own wages. This is easiest to see for salaried workers. Let's imagine, for the sake of convenience, that I'm paying a salary of $26,000/year, $500/week, or $12.50/hour. Forty hours a week for 52 weeks amounts to 2,040 hours. Take out two weeks of vacation, two weeks of sick pay, and two weeks of holidays, and you're down to 1,800 hours of actual expected work, or $14.44/hour. Now add in the benefit of 7.5% of wages being paid in for the employer's half of social security taxes: $1,950/year, or an additional $1.08 per hour. That means that an independent contractor making $15.52/hour but with none of these benefits has functionally equivalent wages to an employee with these benefits making $12.50/hour. And in fact, much of the time, independent contractors receive a pay premium roughly equivalent to that differential in wages. (Low wage workers may not receive the same wage premium as higher-skilled contractors, but they also may not receive the same benefits as employees.)

## Solutions

There is clearly a Medusa's Nest of problems in low-wage employment in America. **Let's start, though, by acknowledging that virtually all low-wage workers in America are on-demand workers.** This acknowledgement lets us enumerate a set of solvable problems:

1. Algorithms used to schedule on-demand workers must be designed to optimize for the needs of workers as well as employers. They should honor workers' schedule preferences, and let them opt-out of assigned schedules without risk of losing their jobs. Companies like Managed By Q have built easy-to-use scheduling software for their janitorial employees that gives those workers substantial control over their schedules. Companies like ADP, Oracle, Kronos, Reflexis, and SAP, the workplace scheduling giants whose software is used by companies like McDonalds, Starbucks, and many others, must also make their software easier to use. But this is primarily an

employer policy and compliance problem, not a software problem.

2. Said algorithms must also give employees predictable schedules, so that they can make time for other life events, and in the event that they are not given enough hours, so that they can schedule shifts with another employer. This may also mean that employers must cooperate with each other in giving shared shift visibility, and relaxing restrictions against workers taking employment from competitors. The Schedules That Work Act is an attempt to address that problem.
3. Employees must be paid for "on call shifts," where the employee is expected to be available, but may not actually be assigned paid work. The recent investigation by the New York Attorney General has begun to drive reforms at many large retailers.
4. There needs to be what Carrie Gleason of the Fair Workweek Initiative calls "a path to accountability." Scheduling software should be auditable by top management and labor leaders alike to ensure that fair workplace practices are being carried out. Gleason wrote, in comments on a draft of this piece, "Susan Lambert and I have been pushing for software to actually monitor and track whether this actually happens and for managers who build schedules aligned with worker preferences to be rewarded." It's important to realize that the scheduling software provided by companies such as ADP or Kronos, like the algorithms used by Uber and Lyft, is a tool. How that tool is deployed and implemented is up to those who use it. As Gleason and Lambert write in their paper Uncertainty by the Hour, "Employers have chosen to use these powerful tools to treat their workers as a cost to be minimized, if not eliminated, instead of using these tools to capture the predictability and stability in labor demand that already exists and deliver it to workers through more predictable and stable hours."
5. Rather than being allowed to assign unreasonable shifts like "Clopens" (when an employee is required to close a store at 11 pm or midnight, and reopen it at 6 am), low wage employers might be required to use free market mechanisms to fill those shifts, paying more if there are workers unwilling to take them at the standard wage. (Currently, workers are compelled to take those shifts by fear of losing their jobs if they don't.) McDonalds or Starbucks or Walmart might not like paying more for these undesirable shifts, but they should not be allowed to compel

workers to take them. It could well be that a market-based approach would bring in enough workers to fill these shifts without higher wages, but at least we'd know that. Uber's "surge pricing" should be seen by policy makers as a labor-friendly workplace innovation!

6. Next Economy on-demand companies using 1099 workers should provide tax guidance to those employees as part of the app. The work that Uber has done with Intuit could easily be extended to estimate overall tax liability so that workers aren't surprised at tax time.
7. We have to close the 29 hour loophole!

Professor Andrei Hagiu, writing in Harvard Business Review, and venture capitalist Simon Rothman, writing on Medium, both argue that we need to develop a new classification for workers besides traditional employees (people who, in the US, have their income reported to the IRS on a W2 form) and contractors (who have their income reported on a 1099 form.) They call them "dependent contractors." This new classification might allow some of the freedoms of independent contractors, while adding some of the protections afforded to employees. (After her recent interview with Secretary of Labor Tom Perez and DOL Administrator David Weil, Lauren Smiley kicked off a discussion about that topic in this article.)

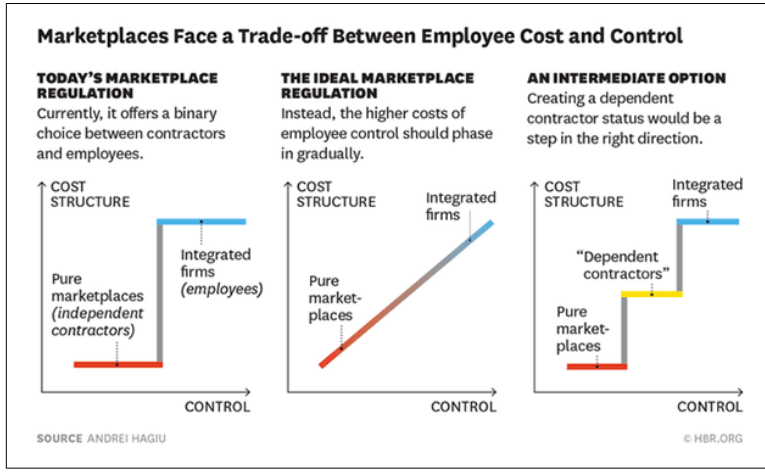


*Figure 3-1. "Companies need an option between employee and contractor." Andre Hagiu, Harvard Business Review*

Nick Hanauer and David Rolf go further, arguing that just as technology allows us to deploy workers without the overhead of traditional command and control employment techniques, it also gives us the ability to provide traditional benefits to part-time workers, They call this a "Shared Security Account" in conscious echo of the safety net of a Social Security account.

A similar policy proposal for portable benefits comes from Steven Hill at New America. Hanauer, Rolf, and Hill all suggest that we decouple benefits like worker's compensation, employer contribution to Social Security and Medicare taxes, as well as holiday, sick, and vacation pay, from employers and instead associate them with the employee, erasing much of the distinction between 1099 independent contractor and W2 employee. Given today's on-demand technology, this is a solvable problem. It is possible to allocate benefits across multiple employers. It shouldn't matter if I work 29 hours for McDonalds and 11 for Burger King, if both are required to contribute pro-rata to my benefits.

This would obviously require some changes to management infrastructure, and data sharing between employers. But given that most scheduling is handled by standard software platforms, and payroll is also handled by large outsourcers, many of whom provide services for competing employers, this seems like an intriguingly solvable problem.

Robert Reich's proposal might be the easiest to implement: "We should aim instead for simplicity: Whatever party—contractor, client, customer, agent, or intermediary—pays more than half of someone's income, or provides more than half their working hours, should be responsible for all the labor protections and insurance an employee is entitled to."

However, none of these proposals have solved the deeper dynamics that drive the 29 hour loophole. It isn't the basic payroll taxes that drive companies to want to have two classes of workers. It is healthcare to start with (a single payer system would solve that problem, as well as many others), but also other "Cadillac" benefits that companies wish to lavish on their most prized workers but not on everyone. Ultimately, the segregation of workers into privileged and unprivileged classes, and the moral and financial calculus that drives that segregation, has to stop!

It will take much deeper thinking to come up with the right incentives for companies to understand the value of taking care of all their workers on an equal footing. Zeynep Ton's Good Jobs Strategy is a good place to start. As Harvard Business School lecturer and former CEO of Stop & Shop José Alvarez wrote, "Using years of research and analysis, Zeynep Ton has proven what great leaders know instinctively—an engaged, well-paid workforce that is treated with dignity and respect creates outsized returns for investors. She demonstrates that the race to the bottom in retail employment doesn't have to be the only game being played."

*Editor's note: this post was first published on Medium. It is republished here with permission.*

## CHAPTER 4

# "This Is Strictly a Business Decision"

When a company says, "This is strictly a business decision," explaining why they must outsource jobs, it's worth reading the fine print and doing a bit of thinking about the numbers.

In this *New York Times* account of the closing of Carrier's Indianapolis factory and the transfer of its 1,400 jobs to Mexican workers making about as much per day as the Minneapolis workers make per hour, Carrier's parent company, United Technologies, explains that "the cuts are painful but are necessary for the long-term competitive nature of the business." But are they? The quote from United Technologies Chief Financial Officer Akhil Johri continues "*...and shareholder value creation*."

What does that actually mean? The article goes on to explain: "United Technologies faces pressure from investors hungry for earnings growth in an economy that's only modestly growing at home, and falling in important overseas markets like China and the Middle East. Although the company's stock has vastly outperformed benchmarks in the last few decades, the shares have badly trailed the Standard & Poor's 500 stock index over the most recent five years.

"Wall Street is looking for United Technologies to post a 17% increase in earnings per share over the next two years, even though sales are expected to rise only 8%. Bridging that gap means cutting costs wherever savings can be found, as Mr. McDonough [President

of United Technologies' climate, controls, and security division] suggested at the meeting with analysts."

Let's do a bit of very rough back-of-the-napkin math here. 1,400 workers making $21/hour, the figure cited in the article, adds up to perhaps $60 million per year in wages, 1,400 workers making $19/day perhaps one-tenth of that. So, the net savings are on the order of $55 million per year. Not chump change, surely. And benefits for U.S. workers add additional cost. So, let's round up and assume that United Technologies saves $75 million/year from the move. This is a company that earned $7.6 billion in profits. That is, to a very rough approximation, this move increases United Technologies profits by 0.1% (one-tenth of 1%).

Even imagining that United Technologies does find enough "cost savings" to increase their earnings by 17% (i.e., adding another $1.3 billion to their profit hoard), does anyone ask why this is so necessary as to decimate yet another American community? I understand that in this era of globalization and business disruption, sometimes it really is necessary to cut costs to survive. But so often, that isn't really the case.

United Technologies is a case in point. Despite the rhetoric, we aren't talking about a company that is on the ropes and needs to cut costs to "remain competitive." In the end, we are talking about a set of money managers on Wall Street, already members of the .01%, demanding that profits rise in order to pump up the stock, SO THAT THEIR INCOME WILL INCREASE, and a set of top managers in the company going along because their compensation is also tied to that rise in stock price. That is, *this is a forced wealth reallocation from one set of stakeholders in the company to another*.

That's why there is so much anger at Wall Street from the followers of both Donald Trump and Bernie Sanders. The system is rigged. Companies are forced to outsource workers not by the market of real goods and services, where supply and demand set the right price, but by financial markets, where greed sets the price. We use the term "the market" for both these things, but they are not the same.

In a well-functioning financial market, financiers provide financing that allows companies to invest, producing both new products and employment, and creating an ecosystem of creators and consumers. But guess what: United Technologies doesn't need to go to financial

markets for capital. In fact, they have so much capital that in December 2015, they just committed to spend another $12 billion to buy back their stock. What is the purpose of a stock buyback? Well, to drive up the stock price. Again, who benefits? Financiers, who are effectively strip mining the company of profits, some of which could instead have gone to workers in the form of higher wages or to society in the form of productive investment in new goods and services.

When a company faces competition in the market of real goods and services, there are three options: innovating, so that you can charge more or grow faster than your competitors (compare Google and the media business, or Apple and a host of competing consumer electronics companies), cutting costs, or accepting a lower level of corporate profit. There is an orthodoxy that I'd like to see challenged: that profits are sacrosanct because they are demanded by "the market," while workers and their incomes are fair game. It is not an economic law as fixed as the law of gravity that a business must always seek the lowest costs and the highest profits, especially when those profits are merely being taken out of the company to pad the pockets of "activist investors." As my friend Nick Hanauer said last year at my Next:Economy Summit, speaking about the argument that a $15 minimum wage will destroy jobs, "That's an intimidation tactic masquerading as an economic theory."

It's as a result of this system of intimidation that corporate profits are at an all-time high and wages at an all-time low as a percentage of total GDP.

We have to stop telling ourselves that we are forced by the market to outsource jobs. We have a choice to reduce corporate profits instead.

CHAPTER 5

# 6 Things to Look for in Next Economy Companies

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work. The following piece was first published in the Next:Economy newsletter.*

There's a lot of buzz about AI, on-demand, robotics, and how all this plays into the future of human work. I've been referring to the current state of the market as "the WTF Economy" and the future desired state as "the Next Economy."

But what exactly makes a Next Economy company? As is always the case, there are lots of companies that show some of the features of the next evolution of technology, but some show the principles more clearly than others. For example, every company now has learned to apply big data and predictive analytics, but 15 years ago, Google was the best Silicon Valley exemplar of this trend. Uber and Lyft have featured in my current writing for much the same reason —not because they are necessarily the most important of the current generation of Silicon Valley companies, but because they are the best examples of some of the deep trends to look for.

So when I'm evaluating Next Economy companies, what do I look for?

**1. They Are Platforms that Enable Networks**

Companies like Uber, Lyft, and Airbnb are building on this fundamental Internet story—the story that brought us Google, YouTube, Facebook, Twitter, and their ilk—but *this time, it's happening in the physical world*.

**2. They Augment Workers, Rather than Just Replacing Them**

The Uber or Lyft driver is an augmented worker, able to do things that would have been impossible without the "sixth sense" of the smartphone. The Uber or Lyft app lets them find a passenger in real time, a needle in the haystack of a crowded city; Google Maps enables them to navigate easily to any address without prior training; Waze helps them avoid traffic and find the best routes without years of driving experience. Augmented workers mean that formerly high-skill jobs are available to a much wider population who are "upskilled" by their devices and apps.

**3. They Create Amazing User Experiences**

Think about how Apple used the capabilities of the smartphone to completely rethink the retail showroom, or how Uber utterly transformed the experience of hailing a cab. For that matter, think about how Uber transformed the experience of paying for a cab!

**4. They Use Technology to Redesign the Way Services Ought to Work**

...rather than just replicating existing services. There were Internet-connected taxicabs before Uber and Lyft came on the scene, but all they used the connection for was to put a credit-card reader in the back of the cab. Maybe the drivers used Google Maps, but no one had put the whole package together.

**5. They Transform the Structure of Their Industry**

Consider two scenarios for deploying AI in healthcare. One treats an AI (such as IBM's Watson) as if it were a very expensive medical appliance, but leaves every other part of the healthcare system unchanged. In contrast, the transformative company will combine AI, smartphone-based diagnostic sensors, and telemedicine to upskill formerly low-wage workers, who will be deployed on demand to take care of people in their homes.

The current revolution in technology has the potential to do for every industry what the first Internet revolution did to media. Industrial-age companies will be replaced by agile networks, managed by algorithm, where workers get new powers and can deliver amazing new services.

As we've seen, though, in the WTF Economy that precedes the Next Economy, workers can also get the shaft, as networks cut costs for consumers in order to drive their growth, forgetting that for the Next Economy to be truly successful, they have to create amazing experiences not just for users but also for the people delivering services to those users. And, as Henry Ford figured out over a hundred years ago, unless we pay workers enough to be customers for the products and services they are delivering, there is no way for those services to become mainstream.

This leads to my final, bonus thought about Next Economy companies...

**6. They Create an Ecosystem**

An ecosystem doesn't just mean an ecosystem of developers and third-party apps (though Slack is the latest to show how that can be done!). It means an ecosystem of producers and consumers, workers and customers, all feeding off each other in that wonderful, infinite game that we call "the economy." In the Next Economy, robots and AIs must be part of the ecosystem; if companies deploy them merely to extract value for themselves, and degrade the opportunities for humans, we'll remain stuck in the WTF Economy.

Here's to a new year of progress toward the Next Economy.

CHAPTER 6

# Escaping the Superstar Syndrome

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

There's a meme going round Silicon Valley that there are programmers with 10x the productivity and impact of an ordinary programmer. I don't doubt it. Sports show us the extraordinary impact that a superstar can have on the success of a team. As my friend Bob Poole used to say whenever we watched an NBA Finals series, "The team with the most superstars wins."

But there's a key word there, and it's not "superstar." It's "team." The TEAM with the most superstars wins.

Success in today's world, whether of sports or business, requires assembling a team of people who can work together to achieve something extraordinary. And yes, to achieve something extraordinary, it helps that some of those people be superstars. But here's another lesson from sports, the best players "make their teammates better." Selfish superstars rarely win.

All of this is by way of introducing the role of talent in the Next Economy.

## Superstar vs. Team

Here are some of the unfortunate changes in business that have resulted from focusing only on the superstar while ignoring the team:

1. Companies have made a deliberate choice to reward their "superstars" incredibly well, while treating ordinary workers as a cost to be minimized or cut. Top US CEOs now earn 373x as much as the average worker, up from 42x in 1980.
2. The bonds of loyalty that once united companies and their workers have frayed or have been deliberately broken. Long gone, for most companies, are the days when individuals spent most of their career working for the same company, ascending the career ladder till they found a comfortable rung on which to work for the rest of their lives.
3. Outsourcing is the new corporate norm. That goes way beyond offshoring to low-wage countries. Right here in the United States, tons of companies are getting away with paying workers less and providing fewer benefits. Think your hotel housekeeper works for Hyatt or Westin? Chances are good they work for Hospitality Staffing Solutions. Think those Amazon warehouse workers who pack your holiday gifts work for Amazon? Think again. It's likely Integrity Staffing Solutions.
4. Technology has been harnessed not to empower workers, but to make them cogs in a tightly controlled machine. (This is the subject of Esther Kaplan's brilliant expose, The Spy Who Fired Me.)

***It doesn't have to be that way.***

In his book *Work Rules*, Laszlo Bock, Google's SVP of People Operations, starts out by comparing Google to Wegmans Supermarkets. Google is one of the most successful high-tech companies in the world, with an average 30% profit margin. Wegmans is a 99-year-old family-run supermarket chain of 84 stores in the Northeast United States with a 1% profit margin. Yet Wegmans has been on the *Fortune* "Best Places to Work" list seventeen times. Google has topped the list six times.

> Command-oriented low-freedom management is common because it's profitable, it requires less effort, and most managers are terrified of the alternative. It's easy to run a team that does what they're told. But to have to explain to them why they're doing something? And then debate whether it's the right thing to do?…It's faster and more efficient to just tell the team what to do and then make sure they deliver. Right?

> Wrong. The most talented people on the planet are increasingly physically mobile, increasingly connected through technology, and, importantly, discoverable by employers. This global cadre wants to be in high-freedom companies, and talent will flow to those companies. And leaders who build the right kind of environment will be magnets for the most talented people on the planet….
>
> The good news is that any team can be built around the principles that Google has used. Even in the garment industry, MIT's Richard Lock found that this kind of approach works. He compared two Nike t-shirt factories in Mexico. Plant A gave workers more freedom, asking them to help set production targets, organize themselves into teams, and decide how work would be broken up, even granting them authority to stop production when they saw problems. Plant B tightly controlled the shop floor, requiring workers to stick to their assigned tasks and adding strict rules about when and how work happened. Locke found that workers at Plant A were almost twice as productive (150 t-shirts per day vs. 80), earned higher wages, and had 40% lower cost for t-shirts….
>
> Dr. Kamal Birdi of the University of Sheffield and six other researchers studied the productivity of 308 companies across 22 years. Performance improved only when companies implemented programs to empower employees,…provided learning opportunities that were outside what people needed to do their jobs, increased their reliance on teamwork (by giving teams more autonomy and allowing them to self-organize), or a combination of these…Only when companies took steps to give their people more freedom did performance improve.
>
> —Laszlo Bock, *Work Rules*

Both, says Bock, are "high-freedom" environments, where employees are given a great deal of discretion to "do the right thing" for customers, and where the company seeks to do the right thing for employees.

MIT's Zeynep Ton, author of *The Good Jobs Strategy*, comes to similar conclusions. She writes:

> Many people in the business world assume that bad jobs are necessary to keep costs down and prices low. But I give this approach a name—*the bad jobs strategy*—to emphasize that it is not a necessity, it is a choice.
>
> There are companies in business today that have made a different choice, which I call *the good jobs strategy*. These companies provide

> jobs with decent pay, decent benefits, and stable work schedules. But more than that, these companies design jobs so that their employees can perform well and find meaning and dignity in their work. These companies—despite spending much more on labor than their competitors do in order to have a well-paid, well-trained, well-motivated workforce—enjoy great success. Some are even spending all that extra money on labor while competing to offer the lowest prices—and they pull it off with excellent profits and growth.

## Tools to Manage a High-Freedom Workplace

In their books, Bock and Ton describe the management style of companies that want to employ high-freedom, good jobs management. I highly recommend both of these books, along with some published by my own company, like *Beautiful Teams*, by Andrew Stellman and Jennifer Green, and *Thinking in Promises*, by Mark Burgess.

But increasingly, there are also software tools that support high-freedom environments. Collaborative ideation tools like Trello, shared document editing with Google Docs or Microsoft Office 360, and real-time conferencing environments like Google Hangouts or Skype have all contributed to the ability of companies to build distributed teams that can come together to solve a problem or work on a time-limited project, and then be reformed to tackle something else.

Slack is the latest (and one of the most promising) of the tools for self-managed ad-hoc teams. It is a real-time communication tool that allows teams to self-organize around any project. Its website proudly claims that "We're on a mission to make your working life **simpler**, **more pleasant**, and **more productive**." And it backs it up with data from a survey of 1,100 teams using Slack: "A 25.1% reduction in meetings. A 48.6% reduction in internal email. 80.4% increase in team transparency. A 32% increase in team productivity."

Stewart Butterfield, the cofounder and CEO of Slack, says:

> What we are selling is corporate transformation…None of the work we are doing to develop the product is an end in itself; it all must be squarely aimed at the larger purpose. Consider the teams you see in action at great restaurants, and the totality of their effort: the room, the vibe, the timing, the presentation, the attention, the anticipation of your needs (and, of course, the food itself); nothing can be off.

> There is a great nobility in being of service to others, and well-run restaurants (or hotels, or software companies) serve with a quality that is measured by its attention to detail. This is a perfect model for us to emulate. Ensuring that the pieces all come together is not someone else's job. It is your job, no matter what your title is and no matter what role you play. The pursuit of that purpose should permeate everything we do.

That's a great vision of what it means to be a team!

> The best—maybe the only?—real, direct measure of "innovation" is change in human behaviour. In fact, it is useful to take this way of thinking as definitional: innovation is the sum of change across the whole system, not a thing which causes a change in how people behave. No small innovation ever caused a large shift in how people spend their time and no large one has ever failed to do so.
>
> —Stewart Butterfield, Slack

In addition to understanding the importance of teams, Next Economy companies understand that they must use technology to augment their workers, not just to replace them. In addition to general-purpose tools, like those outlined above, they focus on tools and training that are specific to their industry.

In a conversation this past spring with BuzzFeed founder and CEO Jonah Peretti, I asked him why he chose to use employees rather than the outsourced content model that has increasingly been used by his peers in the media business. Jonah made a compelling case that he can outperform the market by carefully selecting employees, training them, empowering them with data, and building tools that let them work more effectively together.

Andrew Gauthier, executive producer of BuzzFeed Video, notes:

> Data influences every stage of production. In the pre-production stage, we're very conscious of existing conversations on the Internet, about topics or identities or certain styles that appear to be resonating with people. Everybody that works here lives on the Internet, so it's this very natural thing to say, "Oh, I've noticed that a lot of my friends are posting this type of thing on Facebook." We'll talk about why certain things went viral, then we'll incorporate that into a larger conversation.
>
> And after a video is released?
>
> We pay close attention to how viewers are interacting with our videos. We look at share stats on Facebook, comments on YouTube and BuzzFeed.com, and through those metrics, we will learn about

> what types of things in the video resonated with viewers, and also how viewers use the video to interact with their friends—whether they share on Facebook or Twitter or elsewhere.

Jonah told me that the secret to Buzzfeed's success is taking this learning, and spreading it through the organization, then empowering their producers, and getting out of the way.

I find BuzzFeed fascinating because they have found a way to benefit from Next Economy media platforms like YouTube and Facebook that are designed for individuals to participate, but that can be used even more effectively by a business. The insights and the experience of the best performers can be deployed at scale by their coworkers, leveling up the entire organization. BuzzFeed had revenues of over $100 million in 2014 by recognizing how to put together high-performing teams empowered with data and 21st-century collaboration tools and turning them loose.

## Marketplaces and Teams

It is worth revisiting the comparison between traditional, tightly managed and tightly scheduled low-wage work and the approach of on-demand platform companies like Uber, Lyft, Instacart, and TaskRabbit that I discussed in Workers in a World of Continuous Partial Employment. These firms offer an improvement over the outsourcing trend because they give more autonomy and control over earnings to workers. Workers have the freedom to choose their own schedule, and can work as much or as little as they like. This is an important step toward the "high-freedom" environment that Laszlo Bock explains is so important for productivity.

But we're not at the end point of the evolution of these platforms. The marketplace algorithms that drive these kinds of companies are a real innovation in corporate organization, and need to be understood and improved further. But they often still seem to accept the feudal system that our corporate world has come to resemble, with a privileged class of well-paid aristocrats as employees at the center of the platform, and another class of undervalued serfs acting as subcontractors (what I've called "the franchise of one") providing actual services to end users.

There are glimmers, though, of an understanding that these workers are not all alike, and that companies must make a commitment to

them, even if that commitment doesn't resemble the old pledge of lifetime employment.

In a recent conversation with Leah Busque, cofounder and CEO of TaskRabbit, she noted: "Our job is to build tools that help increase the income of our workers."

This same renewed focus on the worker can be seen in the way that the competition between Uber and Lyft is increasingly not for passengers, who are flocking to both services, but for workers. Which of these companies wins in the marketplace may end up not being driven by technology but by which company provides the most compelling environment and wages for workers, who are ultimately the ones delivering the service that the technology only enables. And as Zeynep Ton makes clear, it takes happy workers to deliver outstanding service.

Unfortunately, the toxic legal environment in which these firms operate makes it more difficult for them to take the necessary next steps to focus on training or other improvements for their on-demand workers. The distinction between employees and subcontractors doesn't really make sense in the on-demand model, which requires subcontractor-like freedoms to workers who come and go at their own option, and where employee-based overtime rules would prohibit workers from maximizing their income. (It's clear that we need a new worker classification, and a portable benefits approach that lets multiple employers contribute to a benefits system that is centered on the employee, not the job.)

However, there are some very interesting ways that platforms can embed training and income improvement opportunities into the platform itself.

Upwork, which many might think of simply as an online platform for outsourcing work to the lowest-cost workers, may have the deepest insights into solving this problem. In a conversation with Stephane Kasriel, the CEO of Upwork, a few months ago, he told me how he thinks about solving the different challenges for various classes of workers on the platform. There are three kinds of workers on Upwork:

1. Those who already have marketable skills, good reputations on the platform, and are getting all the work they need because

they are "in the flow." The platform doesn't need to do much to help these people.

2. Workers who have marketable skills but have not yet built a reputation and are not getting enough work. A lot of the focus of Upwork's data science team is to find these people, and point them to the right open jobs. The challenge here is not just helping them find a perfect match with the work they have the skills for; often it is pointing them to new areas where there is not enough supply, where some study or retraining will let them get a foothold in the virtuous circle of reputation and recommendation. For example, he pointed out that a few years ago, there were plenty of Java developers, but not enough Android developers, and the best way for people in this second group to get traction in the system (and better pay, since Android was paying more than Java) was to gain new skills. Today, there aren't enough workers with data science skills, and there's a pay premium to be had there.
3. Workers who don't have the right skills for the jobs that they are applying for. Here, the right thing to do is sometimes to discourage people from applying for these jobs that they aren't going to get. This wastes the time not only of employers but of the workers themselves. "The time they spend applying for the wrong jobs is time they could spend working."

Upwork has developed its own skills assessment system, and Stephane told me that the company does 100,000 hours of assessment a month! Stephane also makes the point that if you want to understand how to study the dynamics of job marketplaces, there is no better place to do it than on Upwork, because the "velocity of jobs" is so high. What's so fascinating about Upwork's assessment system is that it is immediately verifiable, because someone either is able to do a job to the satisfaction of the customer, or they aren't. This is in stark contrast to many of the assessment tools sold by education companies, which provide paper certifications but little evidence that workers with those certifications can actually do the job.

There's a lot of talk today about online talent platforms and their role in increasing job market liquidity, and there is still a lot to learn. James Manyika and Michael Spence write:

> Much of the impact of online talent platforms stems from the use of technology to bridge information asymmetries that impair labor-market performance. In the past, these gaps were only partly

> bridged by signals carrying useful information. But online talent platforms aggregate much larger amounts of information efficiently, increasing the "signal density."
>
> With expanded data, companies can use predictive analytics to identify the best candidate for a given role. Job seekers can augment their educational credentials and employment histories with samples of their work and endorsements from coworkers and customers, thereby conveying their potential value to employers more effectively.
>
> Furthermore, platforms that aggregate anonymous reviews from current and former employees give individuals a better idea of what it is like to work for a given company, as well as the salary they can and should expect. As employee satisfaction becomes more widely reported, companies are facing pressure to ensure good working conditions in order to recruit the talent they need.
>
> So far, the biggest winners from this shift have been educated and skilled professionals in the advanced economies. In fact, the most sought-after engineers and software developers may not need to apply for jobs at all; companies are now increasingly recruiting "passive" candidates, sometimes forcing employers to increase the salaries of workers they want to retain.
>
> But it is not all good news. Now that employers have new tools for recruitment and assessment, they may find low-skilled workers easier to replace, potentially worsening income inequality in the short run. In the longer term, however, a better overall system for skills upgrading could be designed—one that could be integral to facilitating upward mobility.
>
> And there is another benefit in this regard. As the career outcomes associated with specific institutions and degree programs become more transparent, education and training providers will become more accountable for preparing their students for prosperous and productive lives.

All of these points suggest that we may be reaching a tipping point where we escape the shackles of the superstar syndrome, and instead rediscover how to enable teams, finding people's strengths and matching them with opportunity, building tools that make it easier and more effective to work together, and creating dynamic labor marketplaces in which on-demand, "high-freedom," and the "high velocity" of work go hand in hand.

It all starts, though, with a different mental model of the relationship between company (or platform) and its workers.

Reid Hoffman describes the relationship between companies and individuals today as "The Alliance:"

> The employer-employee relationship is broken, and managers face a seemingly impossible dilemma: the old model of guaranteed long-term employment no longer works in a business environment defined by continuous change, but neither does a system in which every employee acts like a free agent.
>
> The solution? Stop thinking of employees as either family or as free agents. Think of them instead as *allies*.

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CHAPTER 7

# We've Got This Whole Unicorn Thing All Wrong!

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

"Unicorn" is the term du jour in Silicon Valley, used to describe a startup with a valuation of more than a billion dollars. *Fortune* magazine started keeping a list of companies with that exalted status. TechCrunch has a constantly updated "Unicorn Leaderboard."

But there's another kind of unicorn that may be even more important, and that's the breakthrough, once remarkable, that becomes taken for granted. Tom Stoppard wrote eloquently about a unicorn of this sort in his play *Rosencrantz and Guildenstern Are Dead*:

> *A man breaking his journey between one place and another at a third place of no name, character, population or significance, sees a unicorn cross his path and disappear. That in itself is startling, but there are precedents for mystical encounters of various kinds, or to be less extreme, a choice of persuasions to put it down to fancy; until—"My God," says a second man, "I must be dreaming, I thought I saw a unicorn." At which point, a dimension is added that makes the experience as alarming as it will ever be. A third witness, you understand, adds no further dimension but only spreads it thinner, and a fourth thinner still, and the more witnesses there are the thinner it gets and the more reasonable it becomes until it is as thin as reality, the name we give to the common experience…. "Look, look!" recites the crowd. "A horse with an arrow in its forehead! It must have been mistaken for a deer."*

The world today is full of wonders—things that once might have had us say "WTF?!" but are already well on their way to being the stuff of daily life.

The other day, on the bus, I watched one old man show another how the little blue dot in Google Maps followed them along as the bus moved. The newcomer to the technology was amazed. The rest of us now take it for granted that our phones know exactly where we are, and can not only give us turn-by-turn directions exactly to our destination—by car, by public transit, by bicycle, and on foot—but also find restaurants or gas stations nearby, notify our friends where we are in real time, and even report where they are when they are lost.

Google Maps was a unicorn. The original multi-touch iPhone (even before the App Store) was a unicorn. Heck, the World Wide Web was a Unicorn, even though it didn't make Tim Berners-Lee a billionaire. I still remember showing someone the World Wide Web in 1993, clicking on a link and saying "That picture just came from the University of Hawaii." People didn't believe it, thought we were sh*tting them.

Siri, Google Now, and Cortana are unicorns. Uber and Lyft are unicorns.

These things are unicorns not because of their valuation, but because they are the kinds of apps that make us say WTF?!

Can you still remember the first time you realized that you could summon a car, on demand, to pick you up wherever you are? How cool that was, before you started taking it for granted, even complaining about it. (If you haven't seen the late night TV rant by Louis CK, everything is amazing and nobody's happy, watch it now!)

We are layering on new kinds of magic that are slowly fading into the ordinary. A whole generation is growing up that thinks nothing of summoning cars or groceries, or buying something from Amazon and having it show up in a couple of hours, or talking to personal assistants on their devices and expecting to get results.

## Characteristics of Unicorns

So what makes a real unicorn of this amazing kind?

1. It seems unbelievable at first.
2. It changes the way the world works.
3. It has enormous economic impact that is not all captured by the entrepreneurs and venture capitalists who birthed it.

We've talked about the "at first unbelievable" part. What about changing the world? Michael Schrage wrote a fascinating ebook for *Harvard Business Review* entitled "Who Do You Want Your Customers to Become?" He wrote:

> *Successful innovators don't ask customers and clients to do something different; they ask them to become someone different. Facebook asked its users to become more open and sharing with their personal information, even if they might be less extroverted in real life. Amazon turned shoppers into information-rich consumers who could share real-time data and reviews, cross-check prices, and weigh algorithmic recommendations on their path to online purchase. Who shops now without doing at least some digital comparisons of price and performance? Successful innovators ask users to embrace—or at least tolerate—new values, new skills, new behaviors, new vocabulary, new ideas, new expectations, and new aspirations. They transform their customers.*

Schrage also gives a more contemporary example:

> *When Apple television advertisements show iPhone users asking Siri questions or telling "her" what to do, the company is doing far more than showing off the versatility of its voice-recognition, artificial intelligence interface. Siri's company asks its customers to become the sort of people who wouldn't think twice about talking to their phone as a sentient servant.*

And sure enough, there is a new generation of users who think nothing of saying things like:

*Siri, make me a 6 pm reservation for 2 at Camino.*

*Alexa, play "Ballad of a Thin Man."*

*Google Now, remind me to buy currants at Whole Foods.*

Speech recognition itself is hard, but taking actions like these require an ever more sophisticated data infrastructure—what Goo-

gle refers to as "the knowledge graph"—as well as affordances for action, a world of services available by API.

For Google Now to remind me to buy currants the next time I'm at Whole Foods, it has to know where I am at all times, keep track of a particular location I've asked for, and bring up the reminder in that context. For Siri to make me a reservation at Camino, it needs to know that Camino is a restaurant in Oakland, that it is open tonight, and it must be able to call an OpenTable API to actually make the reservation. And it will call other services, either on my devices or in the cloud, to add the reservation to my calendar, so that yet another agent can remind me when it is time to leave for my dinner date.

And then there are the alerts that I didn't ask for, like Google's warnings:

*Leave now to get to the airport on time. 15 minute delay on the Bay Bridge.*

or

*There is traffic ahead. Faster route available.*

And increasingly, companies are offering automatic orchestration of services, like the ability of Tripit to have an Uber waiting for me when my flight arrives.

Everything is amazing, and all we can do is complain! The AIs are going to take our jobs! *No. They are going to transform us and our society.* And we will need to find things to work on that we didn't used to be able to do but now can accomplish with their help.

And that gets me to the third characteristic of true unicorns: they create value. *Not just financial value, but real-world value for society.*

Consider past marvels. Could we have moved goods as easily or as quickly without modern earthmoving equipment letting us bore tunnels through mountains or under cities? This superpower of humans + machines made it possible to build cities housing tens of millions of people, for a tiny fraction of our people to work producing the food that all the rest of us eat.

My point: in the debate about artificial intelligence and the future of work, it's easy to forget just how much technology already suffuses our lives, how much it has already changed us. We need to get past that moment of amazement, and how it fades into the new normal,

and put this technology to work solving real problems. We must commit to building something new, strange to our past selves, but better, if we commit to making it so.

Is it really AI? No, not what is variously called strong AI, or artificial general intelligence—self awareness, and the ability that humans seem to have to recognize new problems, think about them, and come up with novel solutions. Maybe it's safer just to call them algorithms. Off in the distance they appear to be unicorns, but up close, they are just very clever computer programs suffused with masses of data and connected to real-time sensors.

Augmented reality is another of those unicorn technologies. The first time a VC friend of mine saw Magic Leap in action, he said, "If LSD were a stock, I'd be shorting it." That's a unicorn!

But what is most exciting to me about this technology is not the LSD factor, but how powerfully it can change the way we work.

If you're a worker in one of the factory pilots for the Daqri smart helmet, augmented reality is already changing your job. If you're an architect or a teacher in one of the HoloLens betas, it already is changing your job. Peter Coffee led a fascinating conversation about wearables in the workplace at Dreamforce. Garry Orsolini of HP discusses how a remote expert can use real-time audio/video from a wearable to help a press operator of a large industrial printing press debug a problem starting at about 13:30.

You can imagine how technology like this can enable lower-skilled workers to be "upskilled." I'm particularly fond of imagining how the model used by Partners in Health could be turbocharged by augmented reality. The organization provides free healthcare to people in poverty using a model in which community health workers recruited from the population being served are trained and supported in providing primary care. Doctors can be brought in as needed, but the bulk of care is provided by ordinary people. Imagine a community health worker who was able to tap on Google Glass and say, "Doctor, you need to see this!" (Yes, Glass will be back, when Google learns to focus on community health workers, not fashion models!)

It's easy to imagine how rethinking our entire healthcare system along these lines could reduce costs, improve both health outcomes and patient satisfaction, and create jobs—imagine house calls com-

ing back into fashion! Add in health monitoring by wearables, health advice from an AI like Watson made as available as Siri, Google Now, or Cortana, an Airbnb style "franchise of one," an Uber-style on-demand service, and you can start to see the outlines of the "Next Economy" being brought to us by technology.

We'll be talking about all these issues and more at the Next:Economy Summit. If you want to build a Unicorn that isn't just valued at a billion dollars, but that changes the world, we'd like to help you understand how to do just that. Arthur C. Clarke famously said "Any sufficiently advanced technology is indistinguishable from magic." The corollary to that statement is: "But once that technology has been around long enough, no one thinks it is anything special."

*So here's my question to you? What technologies will we be taking for granted five years from now? Ten? What technologies do we take for granted now, and how did people think they were going to change the world when they were introduced? What problems should our current unicorn technologies be tackling? Join in the conversation on Medium.*

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CHAPTER 8

# How On-Demand Logistics Could Save Brick-and-Mortar Retail

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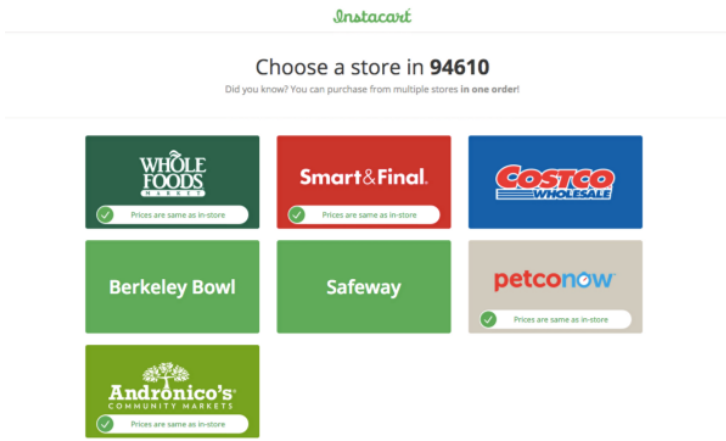
I remember meeting with Borders and Barnes & Noble back in the '90s, urging them to come to grips with the existential threat that Amazon and the rise of online bookselling posed to their business. They didn't take that threat seriously until far too late.

***On-demand delivery presents that same existential threat to retailers today.***

I thought of this recently when reading about how Instacart's business has evolved into a partnership with grocery stores.

Originally, Instacart was a pure consumer play, with on-demand shoppers going into stores on behalf of customers and on-demand delivery drivers taking the goods to their home or business. Recently, Instacart reclassified some of its shoppers as employees, partly because of controversy over W2 (employee) vs. 1099 (independent contractor) classification, but more importantly, because keeping them as independent 1099 workers precluded Instacart from training them. Now Instacart can make sure its shoppers know how to tell when an avocado is ripe without incurring the wrath of the IRS. (Training workers is one of the tests that tax authorities use to determine W2 vs. 1099 status.)

I find this nuanced approach to the W2 vs. 1099 issue to be a great lesson for companies coming to grips with these new technologies. It is clear that there are jobs where managing and training a stable pool of employees makes complete sense. Anyone who has been baffled by the layout of a new grocery store can see the advantages of having a shopper who knows just where everything is. But getting the groceries from the store to your door is the perfect job for an on-demand marketplace of drivers using their own cars and on their own time. (I've written about the power of the algorithmic, on-demand labor model in my recent piece on Uber surge pricing.)




But more than just training, Instacart has been working to integrate its shoppers—and its online storefront—more closely into grocery stores. Instacart has inked partnerships with more than 65 retailers, including Whole Foods, Costco, Petco, and many others. These stores now manage their own storefronts on Instacart.

This strikes me as a quintessential "Next Economy" story. In "Networks and the Nature of the Firm", we quoted Esko Kilpi's advice about how the modern firm needs to change:

> If the (transaction) costs of exchanging value in the society at large go down drastically as is happening today, the form and logic of economic and organizational entities necessarily need to change! The core firm should now be small and agile, with a large network. The mainstream firm, as we have known it, becomes the more expensive alternative.

It was in this context that I thought of the how Borders and Barnes & Noble were defeated by Amazon, and what that might teach us about the emerging competition between brick-and-mortar groceries and Amazon Fresh.

Amazon is a powerhouse not to be trifled with. It has deep technology and logistics capabilities, and its relentless commitment to low prices makes it the Walmart of the internet era. When Amazon Fresh was first announced, it appeared that the brick-and-mortar evisceration by e-commerce might be about to repeat itself in the grocery sector.

But Instacart, in partnership with local supermarkets, brings other advantages to the table. Amazon relies on its vertically integrated network of warehouses and built-in distribution capability. For Instacart, the local supermarket is the warehouse, and the same kind of on-demand workforce that powers Uber and Lyft provides their delivery capability. Supermarkets are typically more local than Amazon warehouses, making delivery more efficient. Instacart delivers in 2 hours by default, or in 1 hour for a higher charge, while Amazon delivers "same day and early morning."

In a small test, I recently tried ordering the same small basket of goods from both Instacart and Amazon Fresh to be delivered to my home in Oakland. Here's what I found:

1. Amazon's minimum order was $50. Instacart's minimum was $10.
2. Instacart offered me one-hour delivery for $3.99 or two-hour delivery for $5.99. Despite claims of same-day delivery, Amazon offered me tomorrow morning as my first option. And Instacart's delivery was within one hour, just as promised.
3. Prices were roughly equivalent, and I was able to shop across multiple merchants to find better prices on particular items. I don't know how the economics of this will hold up, but Instacart even lets you combine items from multiple retailers into a single order.
4. Instacart's selection was actually better. One item in particular, Strauss Organic milk in glass bottles, was unavailable from Amazon, but available from multiple Instacart partner retailers. And when Whole Foods offered only whole milk, Instacart gave me the option to check other retailers who offered Strauss, and I found the low fat milk I wanted at Andronico's instead.

5. Amazon Fresh required me to sign up for an extended version of Amazon Prime at $299 (with a free trial period) before I could place my first order. Instacart lets me either pay delivery charges as I go or join Instacart Express for $99/year, which gives me free two-hour delivery (on any delivery over $35).

In this case, Amazon, the one-time upstart, is now the incumbent, at scale, vertically integrated. Instacart is a new kind of player, adding an on-demand layer to a network of retailers, small and large.

Building their own on-demand delivery service is an even heavier lift for brick-and-mortar retailers than building their own e-commerce operation was in the late '90s. But by partnering with a company like Instacart, retailers (and other companies) can add this capability, and—perhaps—compete credibly with the likes of Amazon Fresh.

The lesson of Borders and Barnes & Noble is that new technologies may seem peripheral to your business, but before you know it, they are in the mainstream of consumer behavior. If you don't understand the future, you are doomed to be steamrollered by it.

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# CHAPTER 9
# What Would Alexa Do?

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Every once in awhile, a product comes along that changes everyone's expectations of what's possible in user interfaces. The Mac. The World Wide Web. The iPhone. Alexa belongs in that elite group of game changers. Siri didn't make it over the hump, despite the buzz it created. Neither did Google Now or Cortana, despite their amazing capabilities and their progress in adoption. (Mary Meeker reports that 20% of Google searches on mobile are now done by voice, and Google Now cards are an essential part of every Android user's experience.) But Alexa has done so many things right that everyone else has missed that it is, to my mind, the first winning product of the conversational era.

Let me talk you through a sample conversation to show you what I mean.

I'm standing in the kitchen cooking, hands dirty. "Alexa, play 'Hamilton.'" (Yes, like everyone else who's seen it, or even heard it once, I'm addicted!) "Playing songs from the original cast recording of 'Hamilton'…" "Alexa, louder." "Alexa, set a timer for 30 minutes." [Music volume goes way down but is still audible while Alexa replies.] "Setting a timer for 30 minutes." [Volume comes back up] …"Alexa, what song is that?" [Again, volume goes down while Alexa replies, then returns to previous volume.] "'Guns and Ships,' by Leslie Odom, Jr., Daveed Diggs, Christopher Jackson, Original Broadway Cast of 'Hamilton'"…[Phone rings.] "Alexa, pause."

[Scramble to wash hands. Wish Alexa was also the interface to my phone!] [End phone conversation.] "Alexa, resume." "Alexa, how much time is left?" "About 9 minutes and 50 seconds left."

What's right about this:

1. Alexa is always listening, so it's hands-free. Once you get used to talking to the thin air and have a device wake up and respond, the idea of pawing at a screen feels as odd as a phone without a touchscreen did starting in 2007, when we got our first taste of multitouch on the iPhone. Touching a microphone icon to go into speech mode doesn't cut it.
2. Alexa can handle some degree of state with aplomb. I can "stack" multiple interactions, and have "her" guess with some accuracy which context a subsequent interaction belongs to. She knows that "pause" goes with the music, and "how much time is left?" goes with the timer.
3. I didn't need to be taught many of the possible interactions. I just guessed that they might work, tried them, and discovered that they do. For example, I discovered that I could ask Alexa what was playing when I called up an elderly friend to whom I'd given an Echo to see how she liked it. She did, she said, except for the fact that she didn't always know what music she was hearing. (Since she was afraid she wouldn't know how to use it, I'd given her very simple instructions, like "Say 'Alexa, play Mozart.'") "Why don't you try asking?" I said. "Say, 'Alexa, what's playing?'" Sure enough, Alexa came back with the exact name (and performers and conductor) of the classical piece she was listening to.
4. The design nuance that the volume simply goes down and Alexa talks over it during an overlapping interaction is one of those "fit and finish" touches that are part of what makes a new UI paradigm (like the one represented by the original Mac or the iPhone) hum, and be a thing of beauty.

Let me contrast this with a similar interaction with Google on my phone.

First off, by default, Google isn't listening on most phones. You have to touch the microphone icon to get it to switch to audio input. This is partly a power issue—unlike an Amazon Echo, the phone has battery life considerations—but it's also a privacy issue. I had a conver-

sation with an Alphabet exec in which I made the point that Amazon had totally stolen a march on them with the Echo. He replied, "Can you imagine the blowback if it were Google that was always listening to you?" He had a point. But that's how the future happens. Someone breaks the barrier, does the unthinkable, and then it becomes thinkable for everyone. I believe that we're at that point with always-on listening agents.

At least on my Nexus 6P, Google has given me the option to enable always-on listening, even from the phone's lock screen. Apple has done the same with Siri on the iPhone 6. But active listening isn't yet on by default, and I suspect eventually it will be. (I first enjoyed this feature on my Moto X, and it made me truly love the phone. But that feature didn't catch on sufficiently to make the phone a breakout success. And now that I've experienced voice interfaces done right on the Echo, I think I know why.)

So let's assume I can wake up my phone hands-free simply by talking with it. Let's replay that interaction, this time on my Nexus 6P.

"Ok, Google, play 'Hamilton.'" "'Hamilton' is a musical about the life of American founding father Alexander Hamilton, with music, lyrics, and book by Lin-Manuel Miranda." [Fail. Responds with the result of a Google search, despite the obvious "play" instruction. Doesn't respond with "this is not in your library." So I try again.] "Ok, Google, play Bob Dylan." [Google Play opens, starts playing Bob Dylan from my library.] Good so far. "Ok Google, pause." Nada. From now on, I'm expected to interact with the app by touching the screen. I have to hit the pause button.

But let me try other possible actions while the music plays. "Ok, Google, what song is playing?" "'Obviously 5 Believers.'" That's promising! But once Google has answered my query about the song, Google Play Music is no longer in the foreground. Some other app or mode has answered my question. So I can't even pause or skip the song with a single touch of the screen. I first have to navigate back to Google Play Music. But even when I do that, I don't get to the control to pause or stop the song. Instead, I get a screen asking me to "Try Unlimited."

That's just bad interaction design, putting the goals of the platform provider above my own. But even if that intervening screen weren't there, you can see that the handoff model, where the conversational agent passes control to an old-school smartphone app, introduces

needless complexity into the interface. The conversational agent needs to remain in the foreground, intercepting requests and routing them to the right app (and if necessary, translating them into the native language of the app so that the user doesn't have to switch modes).

I touch "NO THANKS." Now I can see and press the pause button.

But let's go back to the sample interaction. The music is playing. Can I run the timer over it? "Ok, Google, set a timer for 10 minutes." [Music stops entirely—a much less pleasing interaction than Alexa's gentle muting—while the Clock opens, giving me the countdown timer from which I can see how much time is left, or, if I like, touches to stop or change the timer.] Music resumes playing, but now the Clock app is in the foreground.

And when I asked "Ok, Google, how much time is left?" the question was passed neither to Google Play, nor the Clock. Instead, Google read to me a search result about a calculation that the earth has 7.79 billion years left in the habitable zone.

Let me be clear: the raw capabilities that Google brings to the table are far in excess of Alexa's. I can ask Google questions that Alexa doesn't have a hope of answering. "Ok, Google, how long will it take me to get to Palo Alto?" "Traffic is heavy so it will take you an hour and 10 minutes." And because of its massive amount of stored data as well as real-time sensor data from my phone, and because of its unparalleled expertise in AI, I expect Google to be able to do many things that are impossible for Alexa. But that's precisely why Google should be studying Alexa's voice UI and emulating it.

The user interaction flow between Google's voice interface and its mobile apps is a disaster, as I'm lost in a maze of applications, each of which expects to have control, because the voice agent has never been given authority as conductor of the user experience. I'm forced to switch modes unnecessarily between voice and touch. And when the agent doesn't know what to do, it often invokes clearly unrelated actions. (Alexa does this too occasionally, but far less often. It's much better at saying "I don't know how to answer the question you just asked.")

In addition to creating a consistent voice-only interaction, Alexa's creators have smartly partitioned the possibility space into domains, each with an understandable set of related tasks and questions that

are within the capabilities of the agent. Unlike agents that take the model of "ask me anything" and often fail ungracefully (Siri), or trying to guess what I might want and surface that information unasked (Google Now), Amazon has done a brilliant job of information architecture. Let's think deeply about music, and design for key interactions. OK, how about weather? How about a kitchen timer? What can we do to make the device more fun? ("Alexa, tell me a joke.") There's real evidence of clear and consistent human design anticipation throughout the product. This allows Alexa to appear more intelligent than she actually is.

Alexa's creators demonstrate an essential insight for the era in which we'll increasingly be designing interfaces with and for intelligent agents. Remember that your agent is essentially stupid, and use humans to put it in known situations where its limited abilities are sufficient, and users can easily learn about its capabilities.

Human-computer interaction takes big leaps every once in awhile. The next generation of speech interfaces is one of those leaps. Humans are increasingly going to be interacting with devices that are able to listen to us and talk back (and increasingly, they are going to be able to see us as well, and to personalize their behavior based on who they recognize). And they're going to get better and better at processing a wide range of ways of expressing intention, rather than limiting us to a single defined action like a touch, click, or swipe.

Recent advice says that the hype about conversational interfaces is overdone. "Bots are better without conversation," says Ted Livingston of Kik, a text-message-based bot platform.

I don't buy that. My experience with Alexa on the Amazon Echo convinces me otherwise. Of course, Alexa isn't a chatbot. It's a powerful voice-based service embodied in a special-purpose device. It demonstrates that conversational interfaces can work, if they're designed right.

That leads me to the title of this piece: *What would Alexa do?*

Alexa gives us a taste of the future, in the way that Google did around the turn of the millennium. We were still early in both the big data era and the cloud era, and Google was seen as an outlier, a company with a specialized product that, while amazing, seemed

outside the mainstream of the industry. Within a few years, it WAS the mainstream, having changed the rules of the game forever.

My work on what I called Web 2.0 over a decade ago was an extended meditation on lessons to be learned from Google (and other pioneers of the emerging generation of web applications, platforms, and services). Eventually, these lessons were seen as required learning for every organization, which had to transform itself or die. In that "Oh sh*t" moment, Jeff Jarvis wrote a book called What Would Google Do?, whose cover copy advertised it as "an indispensable manual for survival and success in today's Internet-driven marketplace." That is, if you didn't figure out how to do what Google does, you were screwed! I feel that way right now about Alexa.

If you're making any kind of consumer gadget for the home—a TV, a music system, a thermostat, a security system, a Wi-Fi router, a dishwasher, or a washing machine—you should be asking yourself, "What would Alexa do?" If you're an automotive executive planning to put a big touchscreen in your upcoming model instead of focusing on voice control, you should be asking yourself "What would Alexa do?" If you're a software company, you should be imagining a future in which the devices used to interact with your software are increasingly conversational, and asking yourself "What would Alexa do?" Heck, if you're a restaurant or coffee shop with an app that lets people order and pay in advance, you should be asking "What would Alexa do?"

Fortunately, Amazon is a platform thinker, and so they've provided a neat set of affordances not just for Alexa users but for Alexa developers. App developers can add "skills" to Alexa using the Alexa Skills Kit—for example, once you've added the Lyft skill, you can say, "Alexa, ask Lyft to call me a car." And using the Alexa Voice Service, developers can add voice commands to their own applications. (Google also has a speech API, and so does Microsoft.)

Unfortunately, there's no design API, so you'll have to pay close attention to the way that Amazon has designed the Alexa interface, constantly asking yourself "What would Alexa do?" as you design your speech-enabled application. Designers who carry over too much baggage from the touchscreen era, and don't learn to think natively about speech interfaces, are likely to build poorly thought-out hybrid experiences like the one that keeps me from using speech

as an effective interface to many of the functions of my Android phone.

I recently had the "What would Alexa do?" conversation with a senior technology leader at Facebook. I was pointing out that Facebook uses AI to curate my news feed, with the notion that by watching my behavior, it can guess what stories I most want to see. But I don't always want to see the same thing, I noted, any more than I want a music player that only provides its own curated stream and doesn't give me any choices. It's true that sometimes I want to listen to music that the service chooses for me, but often, I want to express some choice. So too with Facebook. Rather than trying to decide from all the possible posts from my friends which to show me, give me some affordances for expressing my intention.

An Alexa-like Facebook interface would let me say "Facebook, show me personal updates from my friends," and the AI would go to work not trying to divine my taste, but in separating personal updates from links to news stories. At another time, I might say "Facebook, show me links about politics from my friends," or "Facebook, show me funny videos." This is AI put in service of my choices, not trying to replace my choices.

Right now, if I want Facebook to do any of those things, I can only do it by retraining the algorithm over a period of days, religiously avoiding favoriting or clicking on links of the type I don't want to see while choosing only the type I do want. I can't just switch back and forth!

What Alexa has shown us is that, rather than trying to boil the ocean with AI and conversational interfaces, what we need to do is to apply human design intelligence, break down the conversation into smaller domains where you can deliver satisfying results, and within those domains, spend a lot of time thinking through the "fit and finish" so that interfaces are intuitive, interactions are complete, and that what most people try to do "just works."

*Conversational interfaces are only one of many ways that businesses are facing tectonic shifts as a result of new technology. If you want to understand how technologies like AI, robotics, on-demand logistics, and more are going to reshape the business and economic landscape, get the O'Reilly Next:Economy Newsletter.*

*This piece was originally published on LinkedIn.*

CHAPTER 10

# The Game of Business: It's Time to Rewrite the Rules

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

Modern economics likes to think of itself as a science, and too often, its practitioners have attempted to uncover its "laws," as if they were modern Isaac Newtons uncovering the laws of motion. But many of the laws of economics are far more like the rules of a game than like the laws of nature. Some of the rules represent what appear to be fundamental constraints—the availability of resources, say, or the absorptive capacity of the environment, or even the behavioral patterns of human nature—while others are arbitrary and subject to change, such as tax policy, government entitlements, and minimum wage requirements.

An economy has untold possible outcomes. Its complexity comes both from the near-infinite variety that can come from permutations of simple rules, and from the fact that billions of humans are playing the game simultaneously, each affecting the outcomes for each other. Many of the rules are written down nowhere, controlled by no one, and constantly evolving. Individuals, businesses, and governments are all players, and none of them can know the full consequences of their decisions.

Even the simplest and most definitive of the "rules" of an economy are far more complex to apply than they appear on paper. As an Internet wag noted many years ago, "The difference between theory

and practice is always greater in practice than it is in theory." This difference between theory and practice is driven by complex interactions, not only between rules but between multiple players with competing incentives.

This complexity came to mind last year in a conversation I had with Uber's economists. I was arguing that just as Google's search algorithm takes many factors into account in producing the "best" results, Uber's algorithm would benefit if it took drivers' wages, job satisfaction, and turnover into account, and not just passenger pickup time, which is its current fitness function. (Uber aims to have enough drivers on the road in a given location that the average pickup time is no more than three minutes.)

The economists explained to me that Uber's wages were, by definition, optimal, because they simply represent a demand curve, one of the most basic laws of economics.

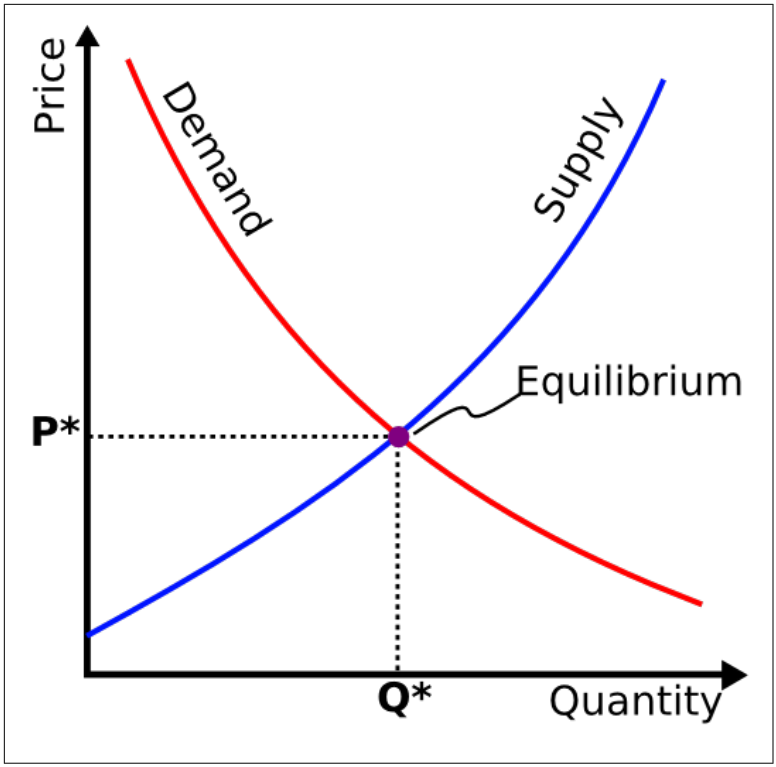



*Figure 10-1. via Wikispaces*

Uber's real-time matching algorithm satisfies two overlapping demand curves. If there are not enough passengers, the price must go down to stimulate passenger demand. That's the essence of Uber's frequent price cuts. But if there aren't enough drivers to satisfy that demand, the price has to go up to encourage more drivers to come on the road. That's the essence of surge pricing.

Uber's argument is that the algorithmically determined cost of a ride is at the sweet spot that will drive the most passenger demand while also providing sufficient incentive to produce the number of drivers to meet that demand. And because driver income is the product of both the number of trips and the rate paid, that sweet spot will also maximize driver income. Any attempt to set rates to specifically raise driver income would suppress rider demand, and so reduce utilization, and thus wages. Of course, if too many drivers show up, this will also reduce utilization, but the economists seem confident, based on data that they were not authorized to share with me, that they have generally found that sweet spot.

If Uber had the courage of its convictions, it would be doing completely algorithmic pricing (including surging prices in a negative direction, below the base price), much as Google sets ad prices with an auction. Why don't they? Because they believe that customers are more comfortable with a known base price. That is, the difference between theory and practice is greater in practice than it is in theory.

I do believe that labor marketplace algorithms can be game changers for business and society if they are used to model and satisfy more and more complex conditions. There's no question that even in their current state, Uber's real-time marketplace algorithms allow for far better matching of supply and demand than the previous structure of the taxicab and limousine industry. But Uber can do better. Algorithms such as these can be a real advance in the structure of our economy, but only if they take into account the needs of workers as well as those of consumers, businesses, and investors.

Here's the rub in the real world: Uber isn't just satisfying the two simultaneous demand curves of customer and driver needs, but also competitive business needs. Their desire to crush the incumbent taxi industry and to compete with rivals like Lyft in the U.S. market and Didi in China also affects their pricing. Under the rules of the venture-backed startup game, they must grow at a rate that will allow them to utterly dominate the new industry that they have cre-

ated in order to satisfy the enormous valuation placed on them by their investors.

Drivers are also not playing a simple game in which they can just go home if the wages aren't sufficient. They have bills to pay, and may have to work far more hours than they would like in order to meet them. They may know in theory that they are depreciating the value of their vehicle and running up expenses that undermine their hourly earnings, but they don't feel they have any choice. Alternative jobs may be even worse, with less flexibility and even lower pay.

I suspect that over time, driver wages will need to increase at some rate that is independent of the simple supply and demand curves that characterize Uber's algorithm today. Even if there are enough drivers, the quality of drivers deeply influences the customer experience.

Driver turnover is a key metric. As long as there are a lot of people willing to try working for the service, it is possible to treat drivers as a disposable commodity. But this is short-term thinking. What you want are drivers who love the job and are good at it, are paid well, and as a result, keep at it. Over the long term, I predict that Uber and Lyft will be engaged in as fierce a contest to attract and keep drivers as they are to attract and keep customers today. And that competition may well provide further evidence that higher wages can pay for themselves by inducing productivity and greater consumer satisfaction.

Many simplistic apologists for the capitalist system celebrate disruption and assume that while messy, it will all work out for the best if we just let "the invisible hand" do its work. This is true, if we correctly understand the invisible hand. The law of supply and demand is not describing some invisible force, but the way that players of the game fight for competitive advantage. There are games within games. As Adam Smith put it:

> It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages.

The "law" emerges from the contest between players. As labor organizer David Rolf said to me, "God did not make being an auto worker a good job!" Those middle class jobs that we look back at

with such nostalgia were the result of a fierce competition between companies and labor as to who would set the rules of the game. The invisible hand became very visible indeed by way of bitter strikes, and then transcended the market into the political process with the National Labor Relations Act of 1935 (the Wagner Act), the Labor Management Relations Act of 1947 (Taft-Hartley), and state "right to work laws." Over the past 80 years, these acts have tilted the rules first one way, then the other.

Right now, we're at an inflection point, where many rules are being profoundly rewritten. Much as happened during the industrial revolution, new technology is obsoleting whole classes of employment while making untold new wonders possible. It is making some people very rich, and others much poorer. It is giving companies new ways to organize; those new forms of organization are gradually being matched by labor.

I am confident that the invisible hand will do its work. But not without a lot of struggle. The political convulsions we've seen in the U.K. and now in the U.S. are a testament to the difficulties we face if we let the invisible hand struggle through normal channels! We are heading into a very risky time.

These discussions are more than theoretical. Rising global inequality is triggering a political backlash that could lead to profound destabilization of both society and the economy. Alas, as my friend Bill Janeway wrote to me in an email, "The supposed laws of welfare economics assert that the optimal distribution of wealth is achieved when (1) no one can be made better off if done so by making someone worse off and (2) the winners compensate the losers. It is also rarely that such compensation is rendered 'from the benevolence' of the winners! Unfortunately, the winners rarely do, except as the result of political coercion." That political coercion may be at hand.

Many discussions of our technological future assume that the fruits of productivity will be distributed to the benefit of all. And that is clearly not the case. Right now, the economic game is enormously fun for far too few players, and an increasingly miserable experience for many others.

"Between the end of World War II and 1968, the minimum wage tracked average productivity growth fairly closely," wrote economist John Schmitt. "Since 1968, however, productivity growth has far outpaced the minimum wage. If the minimum wage had continued

to move with average productivity after 1968, it would have reached $21.72 per hour in 2012—a rate well above the average production worker wage. If minimum-wage workers received only half of the productivity gains over the period, the federal minimum would be $15.34."

Meanwhile, the vast bulk of the value created by increasing productivity has been allocated to corporate profits. Contrary to what you might expect, this is not because companies need those higher profits to grow and sustain themselves, investing in new products and hiring more people in the process. It is because of the unintended consequences of rules designed to align the interests of management and shareholders that instead made management prioritize growth of the stock price above all other considerations. As Rana Foroohar, author of the book *Makers and Takers* and one of the speakers at this year's Next:Economy Summit, put it in a recent *Time* magazine cover story, "the single biggest unexplored reason for long-term slower growth is that the financial system has stopped serving the real economy and now serves mainly itself."

Another huge swath of value has been allocated to consumer surplus —the difference between what goods sell for and what customers might have been willing to pay. (A huge amount of the value that new technology brings has been provided to consumers free of charge, creating consumer surplus that is difficult to measure.) Free trade and depressed wages have also led to fierce competition by companies to expand their market share by offering goods at lower prices (much as Uber has done with taxi fares.) This is also a powerful kind of consumer surplus, and one of many strategies that economic game players employ to gain advantage.

I like to use Walmart as an example of the complexity of the game play and the tradeoffs that players ask us to make as a society. Walmart has built an enormously productive business that has vastly reduced the cost of the goods that it supplies. A large part of the value goes to consumers in the form of lower prices. Another large part goes to corporate profits, which benefits both company management and outside shareholders. But meanwhile, Walmart workers are paid so little that most need government assistance to live—by coincidence, the difference between Walmart wages and a $15 minimum wage for their U.S. workers (approximately $5 billion/year) is not that far off from the $6 billion/year that Walmart work-

ers are subsidized via Federal supplemental nutrition assistance (SNAP, formerly known as "food stamps").

You can see here that there is a five-player game in which gains (or losses) can be allocated in different proportion to consumers, the company itself, financial markets, workers, or taxpayers. The current rules of our economy have encouraged the allocation of gains to consumers and financial shareholders (now including top company management), and the losses to workers and taxpayers. But it doesn't have to be that way.

We can wait for the invisible hand (i.e., the push and pull of the many players in the game) to work things out, or we can try out different strategies for getting to optimal outcomes more quickly. **We can rewrite the rules**.

In professional sports, leagues concerned about competitive play often establish new rules. Football (soccer) has changed its rules many times over the past 150 years. NBA basketball added the 3-point shot in 1979 to make the game more dynamic; rule changes are being proposed again after the game-changing play of Golden State Warriors star Stephen Curry. Many sports use salary caps to keep teams in large markets from buying up the best talent and making it impossible for smaller markets to compete. And so on.

The "fight for 15," the movement toward a national $15 minimum wage, is one way to rewrite the rules. Businesses and free market fundamentalists argue that raising minimum wages will simply cause businesses to eliminate jobs, making workers even worse off. The evidence shows that this isn't the case. As Nick Hanauer said during the Q&A at last year's Next:Economy Summit, "That's an intimidation tactic masquerading as an economic theory."

The key question, expressed in the true language of Adam Smith's "invisible hand," is who gets more, and who gets less. Capital, labor, consumers, taxpayers.

As noted above, a $15 minimum wage might cost Walmart on the order of $5 billion/year. This is no small number. It represents about a quarter of Walmart's annual profits, and about 1.25% of its annual U.S. revenues. But it might save taxpayers $6 billion per year (and that's just the amount used to subsidize Walmart; including all the other low-wage employers in America, the number is far larger.)

If Walmart weren't able to pass off part of its true costs onto taxpayers, the company would have to cut its profits or raise its prices. But is that really such a bad thing? Let's do some back-of-the-napkin math. If Walmart were to reduce its profits by $5 billion (approximately 20%), its market cap might fall, a loss to shareholders. But leaving aside the shock of a sudden drop in earnings due to a change in the rules, would the owners of Walmart really not have wanted to own it if it generated $20 billion a year in profit instead of $25 billion?

If Walmart were to pass along the additional costs to consumers, prices would have to go up by 1.25% (or $1.25 for every $100 spent at Walmart). If the costs were split between capital and consumers, that would require only a 10% drop in Walmart profits and an additional 62 cents per $100 spent by consumers. Would people really stop shopping at Walmart if they had to spend little more than an additional half cent for every dollar?

Those higher prices might discourage some customers, but the higher incomes of workers might encourage them to spend more. So, it's not inconceivable that Walmart and its shareholders would come out whole.

And of course, raising the minimum wage is only one way to address the way that the current rules of our economy favor owners of capital over human workers. Tax rates really do need some rethinking! Why do we have preferential rates for taxes on capital when it is so abundant that much of it is sitting on the sidelines rather than at work in our economy? Why do we tax labor income when one of the problems in our economy is lack of aggregate demand due to insufficient consumer spending?

We could change these relative tax rates, and even institute a "wealth tax," such as proposed by Thomas Piketty, and use the proceeds to help fund a Universal Basic Income! In fact, why not tax carbon rather than labor, substituting a carbon tax for social security taxes, among the most regressive of all taxes imposed? These rule changes might be even more costly to capital owners but might well benefit society overall.

These are political decisions as much as they are purely economic or business decisions. And that is appropriate. Economic policy shapes the future not just for one person or one company, but for all of us.

Throughout history and across continents, economies have played the game using different rules. All land belongs to kings and aristocrats. No one can own the land. All property should be held in common. Property should be private. Property is entailed and cannot be sold by the owners or heirs. Labor belongs to kings and aristocrats and must be supplied on demand. A man's labor is his own. Women belong to men. Women are independent economic actors. Children are a great source of cheap labor. Child labor is a violation of human rights. Humans can be the property of other humans. No human can be enslaved by another.

We look back at some of these rules as barbaric, and others as utopian dreams. But we also can see that some rules have led to golden periods when society flourished.

Here is one of the failed rules of today's economy: humans are expendable. Their labor should be eliminated as a cost whenever possible. This will increase the profits of a business, and richly reward investors. These profits will trickle down to the rest of society.

The evidence is in. This rule doesn't work.

It's time to rewrite the rules. We need to play the game of business as if people matter.

CHAPTER 11

# Don't Replace People. Augment Them.

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

"Could a machine do your job?" ask Michael Chui, James Manyika, and Mehdi Miremadi in a recent *McKinsey Quarterly* article, "Where Machines Could Replace Humans and Where They Can't Yet." The authors try to put the current worries about this question in perspective:

> As automation technologies such as machine learning and robotics play an increasingly great role in everyday life, their potential effect on the workplace has, unsurprisingly, become a major focus of research and public concern. The discussion tends toward a Manichean guessing game: which jobs will or won't be replaced by machines?
>
> In fact, as our research has begun to show, the story is more nuanced. While automation will eliminate very few occupations entirely in the next decade, it will affect portions of almost all jobs to a greater or lesser degree, depending on the type of work they entail.

Instead of the binary question of which jobs will be eliminated, the authors instead wisely point out that it is *tasks* that are being automated, and that automation doesn't simply destroy jobs. It changes them.

But they don't go far enough in their analysis. They assess the potential for job change in terms of the technical feasibility of automating

various activities, the economics of labor supply and demand, and whether the savings from automation will justify the cost. They also note that: "A fourth factor to consider is the benefits beyond labor substitution, including higher levels of output, better quality, and fewer errors. These are often larger than those of reducing labor costs."

But they don't ask what, in my opinion, is the key question.

***What will new technology let us do that was previously impossible?***

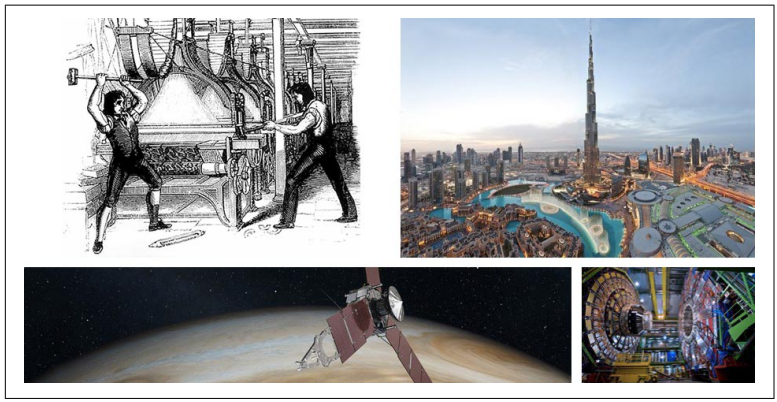


*Figure 11-1. Clockwise from top left: the Luddite rebellion, the Burj al Khalifa in Dubai, the Compact Muon Solenoid at CERN, and Nasa's Juno probe*

Those weavers who smashed machine looms in Ned Ludd's rebellion of 1811 didn't realize that descendants of those machines would make unbelievable things possible. We'd tunnel through mountains and under the sea, we'd fly through the air, crossing continents in hours, we'd build cities in the desert with buildings a half mile high, we'd more than double average human lifespan, we'd put spacecraft in orbit around Jupiter, we'd smash the atom itself! What is impossible today, but will become possible with the technology we are now afraid of?

As Google chief economist Hal Varian has said, "My grandfather wouldn't recognize what I do as work." What are the new jobs of the 21st century—jobs that aren't going to be replaced or changed, but invented out of whole cloth?

Let me explain with a personal anecdote. I used to be legally blind without huge Coke-bottle glasses. My eyes were fixed by an augmen-

ted surgeon able to do something that had been previously impossible. Ten years ago, in my column for Make magazine, I gave an account of my surgery:

> I had laser eye surgery the other day, and after more than forty years of wearing glasses so strong that I was legally blind without them, I can see clearly on my own. I had a perfect outcome: 20/20 for far vision, yet still able to read and do other close work as well. I keep saying to myself: I'm seeing with my own eyes!
>
> But in order to remove my need for prosthetic vision, the surgeon ended up relying on prosthetics of her own, performing the surgery with the aid of a complex of high tech equipment and a team of specialized technicians.
>
> First they mapped my eyes with a device called a corneal topographer, and came up with a modification plan. Then they used a laser to blister the surface of my cornea, and twenty minutes later, the surgeon used a micro-keratome to lift the flap of the blister so another laser could do the real mods to the deeper layers of the cornea. During the actual surgery, apart from lifting the flap and smoothing it back into place after the laser was done, her job was to clamp open my eyes, hold my head, utter reassuring words, and tell me, sometimes with urgency, to keep looking at the red light! Afterwards, I asked what happened if my eyes drifted, and I didn't stay focused on the light. "Oh, the laser would stop. It only works when your eyes are tracking."
>
> In short, surgery this sophisticated could never be done by an unaugmented human being. The human touch of my superb doctor was paired with the inhuman accuracy of complex machines, a twenty-first-century hybrid freeing me from the tyranny of assistive devices first invented in thirteenth-century Italy.
>
> Whether or not we're heading for a Kurzweil-style singularity, in which humans merge with machines, an increasing number of our activities are only possible with the aid of computers and other complex devices. My eye surgery is only one example.
>
> The revolution in sensors, computers, and control technologies is going to make many of the daily activities of the twentieth century seem quaint as, one by one, they are reinvented in the twenty-first.

This is the true opportunity of technology: it extends human capability. There is way too much handwringing about the possibility of technology eliminating human jobs, and way too little imagining new jobs that could only be done with the help of technology.

There's a profound failure of imagination and will in much of today's economy. For every Elon Musk who wants to reinvent the world's

energy infrastructure, build revolutionary new forms of transport, go to Mars, and forge ahead with self-driving cars, there are far too many companies that are simply cutting costs and pulling money out of the economy.

I sometimes think it will take a great crisis to pull us out of our current malaise, in much the same way that World War II helped to end the Great Depression. Climate change or a pandemic or another vast war impelled by anger and hopelessness may be the trigger. But one would hope that we could avoid that dire contingency!

Economic historian Louis Hyman was recently interviewed about the Gig economy (one symptom of the technological displacement that Chui, Manyika, and Miremadi explore). Hyman reflected on what the history of the Great Depression and World War II teaches us about the kind of investment that it will take to make a better future.

> There's a great unraveling, and there's a great forgetting what made possible the post-war life and forgetting that there's a deep connection between security in our economic lives, and security and us as a democratic society, as people who are happy, and vote reasonably and don't, you know, worry about the future as much. Across lines of class, across lines of education, we are all moving towards this freelance economy, this unstable economy. And for some people, it works out great if you're a consultant. You can make tons of money in just one day. And if you're an undocumented worker who's working in very dangerous conditions outside the surveillance of labor law, it's not so good…
>
> Back in the 1930s, when there were homeless encampments in Washington, D.C., very much like the homeless encampments that are now under the I-280 in San Francisco, the federal government invested capital in new industries to create jobs for millions of people. They created tax codes that redistributed from the rich to the poor…

But redistribution of income and the beginnings of the modern social safety net were only part of the story. Hyman continued:

> The New Deal's Reconstruction Finance Corporation not only helped light up America—moving it from 10 percent of homes having electricity in 1930 to more than 60 percent a decade later—it also funded research in the Defense Plant Corporation.
>
> It was fundamentally about investment in edgy technology, so things like aerospace, aluminum extraction, synthetic rubber were all brought to scale…Aerospace before 1939 had fewer people

> working in it than worked in candy manufacturing. And after World War II, the aerospace industry was four times the size of the pre-war car industry. This is incredible scale and scope of an endeavor, to utterly transform the economy in about five years, by using idle capital….
>
> There's so much capital out there, and they don't know where to put it. It's hard for us to imagine as normal people, but for the big players in the global economy, the pension funds, the hedge funds, the bazillion billionaires, they're desperate to find an outlet for capital. And right now, the best outlook for capital is our home mortgages and our credit card loans. And until we provide them with better outlets, like we did during the 1930s and '40s, to invest in aerospace and more cutting edge technology in industries that employ millions, it's going be very hard to get our economy going again. And fundamentally, this is how capitalism has to work. It has to be a virtuous cycle, where capital comes into businesses, is invested and creates new jobs.

Hyman's reminder that during World War II we utterly transformed the US economy during a period of only five years should inspire us to ask what's holding us back today. Do we need a crisis, or can we make bold moves without one?

How we frame the future matters! If we create an attitude of fear toward technology, we miss the huge opportunity to put it to work solving problems that bedevil us today. It's our responsibility as entrepreneurs and technologists to rethink what's possible!

Technology lets us rethink the very structure of how we do things. Consider, for example, the way that Uber and Lyft have transformed urban transportation. There were connected taxicabs long before Uber—but all they did was to recreate the old process. What we got for our connectivity was a credit card reader in the back and a small screen showing us ads. What Garrett Camp and Travis Kalanick realized was that humans were now augmented by location-aware smartphones, and so you could completely rethink the way you summoned a car. It would be utter magic to someone from the past—that you can click on your phone and summon a car to wherever you are, and to know just how long it will take for a car to pick you up.

But when Uber started talking about self driving cars, they lost the plot and started talking only about cutting costs and eliminating workers. Rather than crowing about how they'd finally get rid of those pesky drivers, they should have been talking about an experi-

ment that they've run since 2014, delivering flu shots. "Sure, we won't always have drivers. But just imagine how many other jobs we can restructure and make more magical and on demand once the transportation is even cheaper and more convenient!"

Zipline is completely rethinking how healthcare could be delivered in an on-demand world. Their pilot project in Rwanda looks to address one of the leading causes of death—postpartum hemorrhage—by delivering blood on demand, via high-speed drone, to locations without modern transportation or healthcare infrastructure. But if you think about it, on-demand technology could be transforming healthcare everywhere—if we think big, and use technology not just to cut costs and improve profits but to deliver previously impossible services!

If you'd told the weavers of Ned Ludd's time that those machines they were smashing would mean that ordinary people would have more changes of clothing than the richest nobles of their day, they would have shaken their heads in astonishment.

***What might we be astonished by if we have the courage to invest in the possibilities of a better future?***

CHAPTER 12

# Machine Money and People Money

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

At the outset of the Great Depression, John Maynard Keynes penned a remarkable economic prognostication: that despite the ominous storm that was then enfolding the world, mankind was in fact on the brink of solving "the economic problem"—that is, the quest for daily subsistence.

The world of his grandchildren—***the world of those of us living today***—would, "for the first time…be faced with [mankind's] real, his permanent problem—how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well."

It didn't turn out quite as Keynes imagined. Sure enough, after a punishing Depression and a great World War, the economy entered a period of unparalleled prosperity. But in recent decades, despite all the remarkable progress of business and technology, that prosperity has been very unevenly distributed. Around the world, the average standard of living has increased enormously, but in modern developed economies, the middle class has stagnated, and for the first time in generations, our children may be worse off than we are. Once again, we face what Keynes called "the enormous anomaly of unemployment in a world full of wants," with consequent political instability and uncertain business prospects.

But Keynes was right. The world he imagined, where "the economic problem" is solved is, in fact, still before us. Global poverty has sunk to all-time lows, and, if only we play our cards right, we could still enter the world Keynes envisioned.

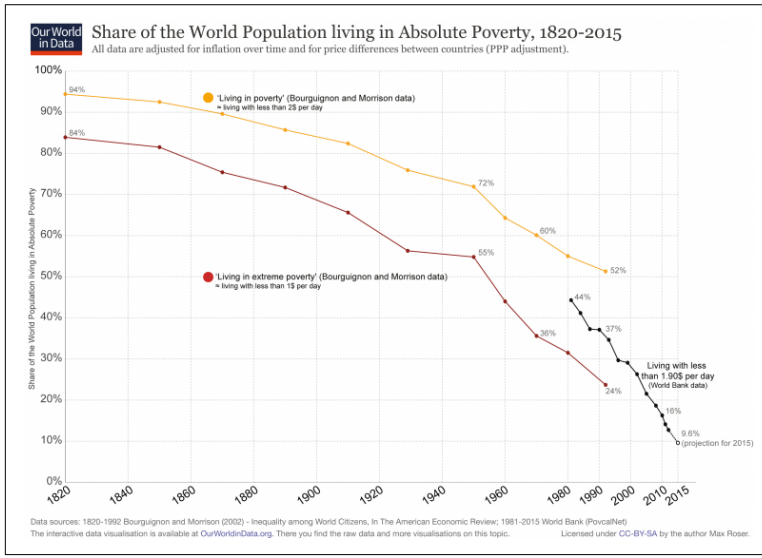



*Figure 12-1. Technology and free trade have greatly reduced poverty in the world, even as they have created economic challenges for workers in developed countries*

As Max Roser, creator of Our World in Data, notes: "Even in 1981 more than 50% of the world population lived in absolute poverty—this is now down to about 14%. This is still a large number of people, but the change is happening incredibly fast. For our present world, the data tells us that poverty is now falling more quickly than ever before in world history."

Much of Keynes' essay, entitled "Economic Possibilities for our Grandchildren," concerns the issue of what people will do with their time when productivity has increased to the point where the machines do all the work.

That question has resurfaced in today's discussions about Universal Basic Income (UBI). Fabled labor leader Andy Stern left his job as the head of the SEIU to write a book making the case for UBI; Y Combinator Research is planning a pilot program in Oakland, CA; and the question of UBI has actually come to a vote in Switzerland.

The proposal was soundly defeated, but the fact that it was considered seriously tells us how far the idea has come since it was proposed by Thomas Paine in 1795, and more recently by Milton Friedman in 1962 (and Paul Ryan in 2014).

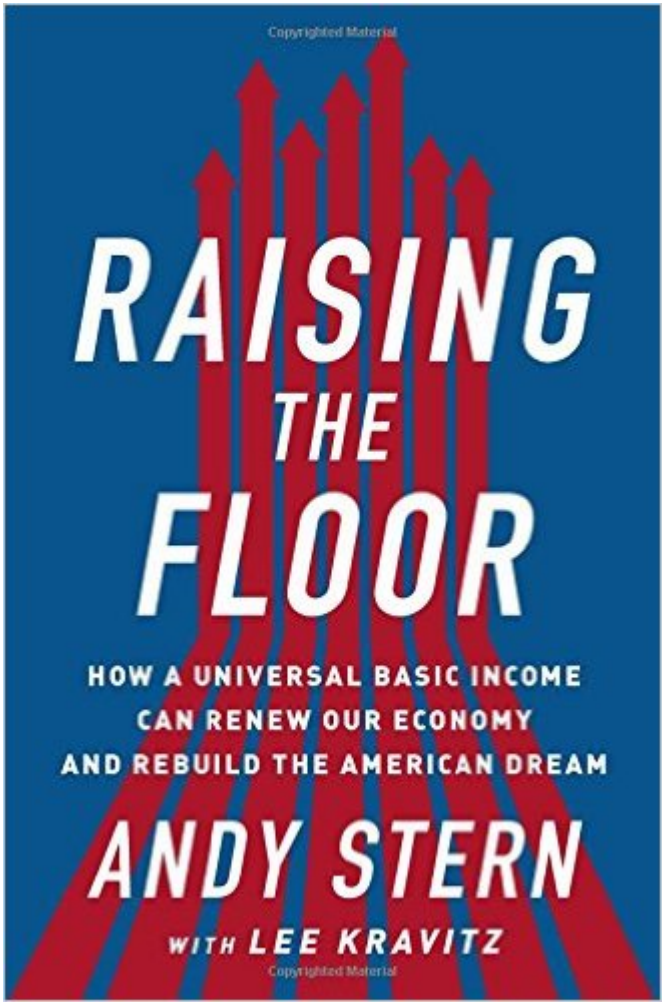



*Figure 12-2. Raising the Floor*

I'd like to talk through some key paragraphs from Keynes' essay, and reflect on their truth as seen in today's headlines. Think of this as the conversation I'd be having with Keynes if he were still around to have it. Then I'll weave in some thoughts from a recent conversation

with Y Combinator's Paul Buchheit about these same ideas. These are half-formed thoughts, not polished conclusions. I'd welcome your feedback!

Keynes' essay opens:

> We are suffering just now from a bad attack of economic pessimism. It is common to hear people say that the epoch of enormous economic progress which characterised the nineteenth century is over; that the rapid improvement in the standard of life is now going to slow down; that a decline in prosperity is more likely than an improvement in the decade which lies ahead of us. I believe that this is a wildly mistaken interpretation of what is happening to us. We are suffering, not from the rheumatics of old age, but from the growing-pains of over-rapid changes, from the painfulness of readjustment between one economic period and another…."

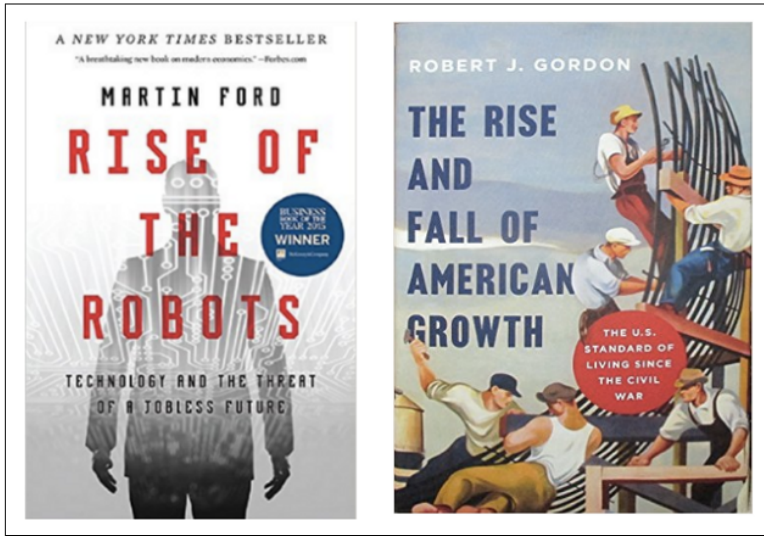



*Figure 12-3. The Rise of the Robots and The Rise and Fall of American Growth both describe "headwinds" that may limit future wages for workers*

Sure enough, we are indeed once again hearing the chorus of pessimism and doubt. Automation is going to destroy white collar jobs in the same way it once destroyed factory jobs. We have an economy that relies on growth, but the age of growth is over. We are in the age of "secular stagnation." And so on.

Keynes presciently gave a new name to the heart of our current angst:

> We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come—namely, technological unemployment. This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour. But this is only a temporary phase of maladjustment.

Like Keynes, I remain optimistic. If we play our cards right, this can be only "a temporary phase of maladjustment." There may be enormous dislocation, but we will come through it in the end. Keynes wrote:

> The prevailing world depression, the enormous anomaly of unemployment in a world full of wants, the disastrous mistakes we have made, blind us to what is going on under the surface….

"The enormous anomaly of unemployment in a world full of wants." I love that phrase! As Nick Hanauer has said to me, "Technology is the solution to human problems. As long as we haven't run out of problems, we won't run out of work."

**There is so much left to do**: dealing with the enormous transitions to our energy infrastructure that will be required to respond to climate change, the public health challenges of new infectious diseases, the demographic inversion in which a growing class of elders will be supported by a smaller cohort of workers, rebuilding the physical infrastructure of our cities, providing clean water to the world, feeding, clothing, and entertaining 9 billion people.

Note that Nick said "we won't run out of work," not "we won't run out of jobs." Part of the problem is that "the job" is an artificial construct in which work is managed and parceled out by corporations and other institutions, to which individuals must apply to participate in doing the work. Financial markets are supposed to reward corporations to pursue work that needs doing. But as Rana Foroohar has noted in her excellent new book *Makers and Takers: The Rise of Finance and the Decline of American Industry*, there is a growing divergence today between what financial markets reward and what the economy really needs.

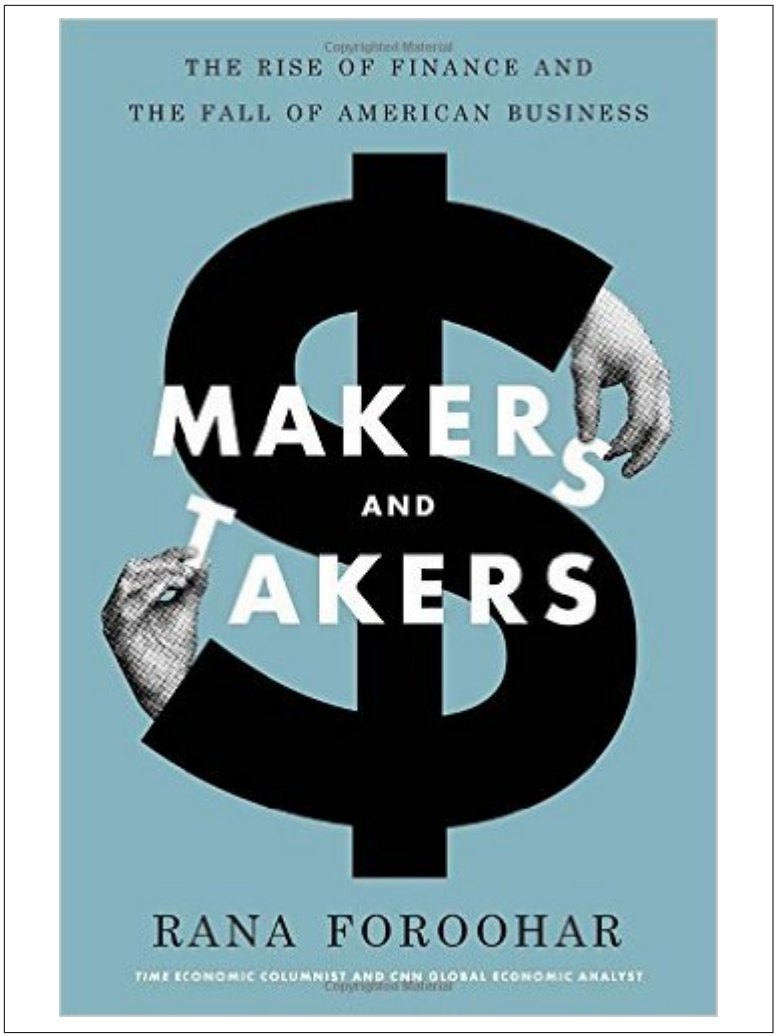



*Figure 12-4. Makers and Takers author Rana Foroohar will be joining us at the Next:Economy Summit*

Because corporations have different motivations and constraints than individuals, it is possible that a corporation is not able to offer "jobs" even as "work" goes begging. Because of the structure of employment, in uncertain times, companies are hesitant to take on workers until they are sure of demand. And because of the demands of financial markets, companies often find short-term advantage in cutting employment, since driving the stock price gives owners a

better return than actually employing people to get work done. Eventually "the market" sorts things out (in theory), and corporations are once again able to offer jobs to willing workers. But there's a lot of unnecessary friction.

One of the challenges of the Next Economy is to create new mechanisms that make it easier to connect people and organizations to work that needs doing—a more efficient marketplace for work. And you can argue that that is one of the key drivers at the heart of the on-demand revolution that includes companies like Uber and Lyft, DoorDash and Instacart, Upwork, Handy, TaskRabbit, and Thumbtack. The drawbacks of these platforms in providing consistent income and a social safety net shouldn't blind us to what does work about them. We need to improve these platforms so that they truly serve the people who find work through them, not try to turn back the clock to the guaranteed employment structure of jobs in the 1950s.

There is also a leadership challenge: to correctly identify work that needs doing. We need companies to take on visionary projects that are not being solved by the market "as it is" but that instead reshape the market. Think of what Elon Musk has done to catalyze new industries with Tesla, SpaceX, and SolarCity, or what Google did with "access to all the world's information," or what the Gates Foundation is doing to eliminate malaria. Markets are not infallible. Government can play a role here, as it did with the Internet, GPS, and the Human Genome Project. And government's role is not limited just to projects that require coordinated effort beyond the capability of even the largest commercial actors. Government must deal with market failure. This can be the failure of the commons, outright malfeasance by commercial actors, or problems with financial markets such as the the one that is still strangling the economy today.

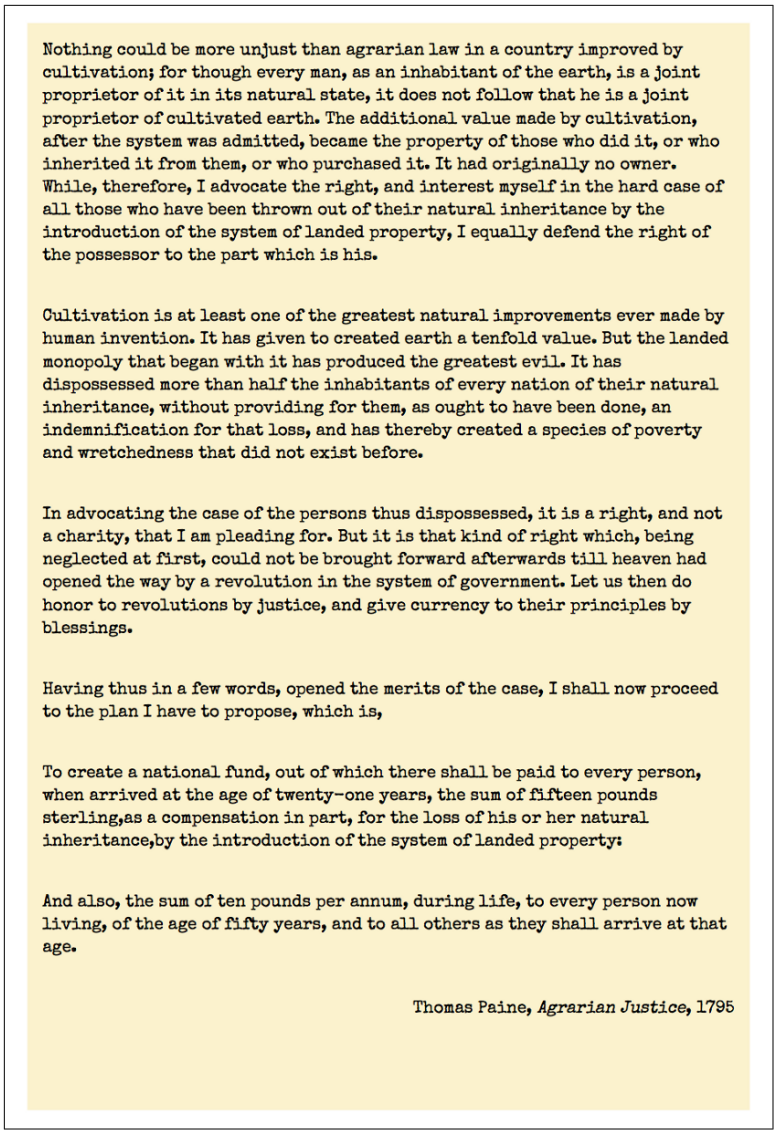
But Keynes' essay gets even more interesting. Let's repeat the lines quoted above and match them with their conclusion:

> The prevailing world depression, the enormous anomaly of unemployment in a world full of wants, the disastrous mistakes we have made, blind us to what is going on under the surface….for the first time since his creation man will be faced with his real, his permanent problem—how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well.

In a recent conversation, Paul Buchheit, creator of Gmail and now a partner at Y Combinator, said something really provocative: "There may need to be two kinds of money: machine money and human money. Machine money is what you use to buy things that are produced by machines. These things are always getting cheaper. Human money is what you use to buy things that only humans can produce."

Paul continued: "The key thing that humans offer that machines do not is 'authenticity'. You could buy a machine-made table from Amazon for cheap, or a hand-crafted table from a person for much more (and for real authenticity, we want it to come from a local artisan, not an anonymous factory worker on the other side of the world). In the long term, the price of the former (in machine money) should trend towards zero, but the latter will always cost about the same in human money (some quantity roughly proportional to the number of hours required to make it)."

Paul argues that the right name for what many are calling "Universal Basic Income" should be "the citizen's dividend." This concept traces back to ancient Athens, and in America to the writings of Thomas Paine. In Paine's conception, the dividend was based on shared ownership of natural resources—and this is just what we've already seen done in a country like Norway, in Alaska, and in a notable experiment during the 1970s, in a small town in Manitoba.



Nothing could be more unjust than agrarian law in a country improved by cultivation; for though every man, as an inhabitant of the earth, is a joint proprietor of it in its natural state, it does not follow that he is a joint proprietor of cultivated earth. The additional value made by cultivation, after the system was admitted, became the property of those who did it, or who inherited it from them, or who purchased it. It had originally no owner. While, therefore, I advocate the right, and interest myself in the hard case of all those who have been thrown out of their natural inheritance by the introduction of the system of landed property, I equally defend the right of the possessor to the part which is his.

Cultivation is at least one of the greatest natural improvements ever made by human invention. It has given to created earth a tenfold value. But the landed monopoly that began with it has produced the greatest evil. It has dispossessed more than half the inhabitants of every nation of their natural inheritance, without providing for them, as ought to have been done, an indemnification for that loss, and has thereby created a species of poverty and wretchedness that did not exist before.

In advocating the case of the persons thus dispossessed, it is a right, and not a charity, that I am pleading for. But it is that kind of right which, being neglected at first, could not be brought forward afterwards till heaven had opened the way by a revolution in the system of government. Let us then do honor to revolutions by justice, and give currency to their principles by blessings.

Having thus in a few words, opened the merits of the case, I shall now proceed to the plan I have to propose, which is,

To create a national fund, out of which there shall be paid to every person, when arrived at the age of twenty-one years, the sum of fifteen pounds sterling,as a compensation in part, for the loss of his or her natural inheritance,by the introduction of the system of landed property:

And also, the sum of ten pounds per annum, during life, to every person now living, of the age of fifty years, and to all others as they shall arrive at that age.

Thomas Paine, *Agrarian Justice*, 1795

*Figure 12-5. Thomas Paine's Agrarian Justice made the appeal for sharing the value of unimproved land with every citizen of the new United States*

Where Paine argued that every citizen had a right to the underlying value of unimproved land, Buchheit suggests that all of mankind should have some claim on the fruits of technological progress. That

is, we should use tax policy to capture some amount of the bounty from machine productivity, and provide that to all people as a stipend with which they can meet the needs of everyday existence. This bounty should be distributed sufficiently that everyone can have enough "machine money" to meet their basic needs. Meanwhile, that machine productivity should also provide those goods at ever lower costs, increasing the value of the citizen's dividend. This is the world of prosperity that Keynes envisioned for his grandchildren.

How might we pay for a Universal Basic Income? The amount required is greater than the cost of all current social programs. In a separate conversation, Y Combinator chief Sam Altman explained that those who argue about how we would pay for it today miss the point. "I am confident that if we need it, we will be able to afford it," he said at a recent event on UBI at Bloomberg Beta with Andy Stern and the Aspen Institute's Natalie Foster. One major factor that isn't being considered, as he expanded on it in our subsequent conversation, is that the possible productivity gains from technology are enormous, and these gains can be used to reduce the cost of any goods produced by machines—what costs $35,000 today might cost $3,500 in a future where the machines have put so many people out of work that a Universal Basic Income is required. This is why Paul argues for "machine money." In a profound way, its value inflates not as a currency normally inflates, but because the lower costs provided by machine productivity constantly increase its purchasing power.

## What Is "Human Money" For?

I love Paul's distinction between two types of money, but I do wonder whether it's complete. His notion of human money encompasses two very different classes of goods and services: those that involve a true human touch—parenting, teaching, caregiving of all kinds—and those that involve creativity.

Perhaps "human money" needs to be further subdivided into "caring money" and "creativity money."

Caring is a necessity of life, just as is food and shelter, and should not be denied to anyone in a just society. In an ideal world, caring is a natural outgrowth of family and community, as we care for those we love, but there is also a caring economy of professionals, includ-

ing teachers, doctors, nurses, eldercare assistants, babysitters, hairdressers, and masseusses. And in a society with an inverted demographic pyramid, in which there are far more of the elderly than young people to support them, as we will see in many developed countries by 2050, machines may help to fill this gap.

Creativity money is what we pay for the good things of life beyond the basics. The latest LeBron James basketball shoe. Adele's "Hello." The glass of wine with friends. The night out at the movies. The beautiful dress and the sharp suit. Sports, music, art, storytelling, and poetry.

It's a mistake to think that "the creative economy" is limited to entertainment and the arts. People at all levels of society pay a premium over the base cost of goods as a way of expressing and experiencing beauty, status, belonging, and identity. Creativity money is what someone pays for the difference between a Mercedes C-Class and a Ford Taurus, for a meal at The French Laundry rather than the local French bistro, or at that same bistro rather than at a McDonald's. It is why those who can afford it pay $5 for an individually crafted cappuccino rather than drinking Folgers instant coffee from a 5-pound can, as our parents did. It is why we pay huge prices or wait years to see *Hamilton*, while tickets for the local dinner theater are available right now.

Creativity money is the focus of a competition as intense as any that characterizes the machine money economy. It is already at the heart of huge swaths of our economy: industries like fashion, real estate, luxury goods, all depend on the competition among people who are already rich to own more, to enjoy or sometimes just to show off their wealth.

In the late 18th century, in his short novel *Rasselas*, Samuel Johnson wrote:

> But for the Pyramids, no reason has ever been given adequate to the cost and labour of the work. The narrowness of the chambers proves that it could afford no retreat from enemies, and treasures might have been reposited at far less expense with equal security. It seems to have been erected only in compliance with that hunger of imagination which preys incessantly upon life, and must be always appeased by some employment. Those who have already all that they can enjoy must enlarge their desires. He that has built for use till use is supplied must begin to build for vanity, and extend his

> plan to the utmost power of human performance that he may not be soon reduced to form another wish.

That is, even in a world where every need is met, there will still be "a world full of wants." Keynes wrote of this kind of competition too in "Economic Possibilities for our Grandchildren":

> Now it is true that the needs of human beings may seem to be insatiable. But they fall into two classes—those needs which are absolute in the sense that we feel them whatever the situation of our fellow human beings may be, and those which are relative in the sense that we feel them only if their satisfaction lifts us above, makes us feel superior to, our fellows. Needs of the second class, those which satisfy the desire for superiority, may indeed be insatiable; for the higher the general level, the higher still are they. But this is not so true of the absolute needs—a point may soon be reached, much sooner perhaps than we are all of us aware of, when these needs are satisfied in the sense that we prefer to devote our further energies to non-economic purposes.

Given an income sufficient to the necessities of life, some people will choose to step off the wheel—to spend more time with family and friends, in creative pursuits, or whatever they damn well please. But even in a world where the machines do most of the essential work, the competition for additional creativity money will drive the economy.

Keynes foresaw both of these possibilities. He wrote:

> The strenuous purposeful money-makers may carry all of us along with them into the lap of economic abundance. But it will be those peoples, who can keep alive, and cultivate into a fuller perfection, the art of life itself and do not sell themselves for the means of life, who will be able to enjoy the abundance when it comes.

And this is the interesting bit. Creativity can be the focus of an intense competition for status, so that "he who has built for use till use is supplied must begin to build for vanity." But it can also be the key to a future human economy that would let all enjoy the fruits of leisure that are brought to us by machine productivity.

The good life consists in enjoying the creativity of others, and in sharing our own, not just in having our basic needs met. Much of this, like caring, is a natural outgrowth of a successful human society, not an economic pursuit.

Creativity, and the patronage of creativity, may be a major component of the future economy.

In this regard, I'm fascinated by a comment that Hal Varian, Google's chief economist, made to me over dinner one night: "If you want to understand the future, just look at what rich people do today." (He's also made that same comment in writing, on more than one occasion.) It's easy to think of this as a heartless libertarian comment. Our dinner companion, Hal's former student Carl Shapiro, fresh from his stint at Obama's White House Council of Economic Advisers, seemed horrified. But when you think about it for a moment, it makes a lot of sense.

Dining out was once the province of the wealthy. Now far more people do it. In our most vibrant cities, a privileged class experiences a taste of a future that could be the future for everyone. Restaurants compete on the basis of creativity and service, "everyone's private driver" whisks people around in comfort from experience to experience, and one-of-a-kind boutiques provide unique consumer goods. Rich people once took the European Grand Tour; now soccer hooligans do it. Cell phones, designer fashion, entertainment have all been democratized. Mozart had the Holy Roman Emperor as his patron; Kickstarter, GoFundMe, and Patreon extend that opportunity to millions of ordinary people.

New industries driven by the human touch are everywhere. In the US, more than 4,200 craft breweries now make up more than 10% of the market, and command a price double that of a mass-produced beer. In the first quarter of 2016, 25 million customers purchased hand-crafted and artisan goods on Etsy. These are small green shoots in an economy dominated by mass-produced products, but they teach us something important about the future.

What is happening in entertainment may be an even more interesting harbinger. While blockbusters still dominate in Hollywood and New York publishing, a larger and larger proportion of people's entertainment time is spent on social media, consuming content created by their friends and peers. That profound shift in media consumption has most visibly enriched Facebook, Google, and the current generation of media platforms, but it's increasingly turning into a real job for a larger and larger number of individual media creators.

As YouTube star and VidCon impresario Hank Green wrote recently:

> I started paying my bills with YouTube money around the time I hit a million views a month. My content was admittedly low budget and "views" isn't necessarily the best metric (what it means changes drastically based on platform), but I want you to take a guess at how many YouTube channels now get more than a million views a month? A couple hundred? A thousand?
>
> How about 37,000.
>
> For context, Facebook has 12,000 employees….
>
> If "internet creator" were a company, it would be hiring faster than any company in Silicon Valley.

Keep in mind that "YouTube money," as Hank names it, is only one of many new forms of creative money that are available via online platforms. There's Facebook money, Etsy money, Kickstarter money, App Store money, and more.

Some of these marketplaces are further along than others in creating opportunities for individuals and small companies to convert attention (the raw material of creativity money) into cash. The next few years will see an explosion of startups that find new ways to convert more and more of the attention that is spent online into traditional money.

As Jack Conte, half of the musical duo Pomplamoose and founder and CEO of crowdfunding patronage site Patreon, told me, he founded Patreon after "Nataly and I got 17 million views of one of our music videos, and it turned into $3,500 in ad revenue. Our fans value us more than that."

As crowdfunding sites like Patreon (and, of course, Kickstarter and IndieGoGo) show, there are increasingly new opportunities for ordinary people to compete for real currency, not just attention, in the creative economy. These sites are still a relatively small part of the overall economy, but they have a lot to teach us about its possible future direction.

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*For more reading about the shape of the Next Economy, subscribe to the Next:Economy newsletter.*

# CHAPTER 13
# Work Is More than a Source of Income

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

I completely agree that Universal Basic Income (UBI) is a good idea. But I think that's just the beginning of the discussion.

I had a fascinating conversation recently with MIT economist David Autor. I asked him if there were any good economic studies of various countries that had some equivalent to UBI—Indian reservations with casinos, Norway, and Saudi Arabia came up as possibilities.

Autor said that there haven't been any good published studies, but his informal observations were eye opening. On Indian reservations, there has been some nastiness about "voting people off the island"—i.e., voting people out of the tribe in order to concentrate the benefits, but there's apparently some evidence that it has done good things in terms of improving quality of life and engagement. In Saudi Arabia, where most forms of work are looked down upon and half the population (i.e., women) are not allowed to work outside the home at all, universal income has led to a situation in which most non-government work is done by guest workers, the privileged classes mostly work at sinecure jobs for the government, and there's a culture of luxury and indulgence among those classes.

Norway seems to have got it right. As I recall, David said "Everyone works. Just not that much." Norway has very high labor force partic-

ipation, but also very generous social benefits, allowing people lots of time to care for family and friends and engage in social activity. The key, he said, was that all kinds of work are seen as having dignity.

That question of what we dignify as work and that people get social status and satisfaction from is a thread that runs through the Next:Economy summit. Laszlo Bock told me an amazing story, which he in turn heard from Zeynep Ton (also a speaker at the event) about a hospital janitor who went out of his way to change the pictures in the rooms of people in a coma, in hopes that it would make a small difference to them. (Since this story is retold twice over, I hope I got it right.)

Anne Marie Slaughter, also a speaker at the event, notes that "Caring is our most important work." She identifies the low value that we as a society place on this work as something we have to reverse. That low valuation on caring is what drives women out of the workforce, for example, as they take time to care for children, aging parents, and other family members.

The dignity of work more broadly strikes me as a key question. If everyone has a basic income, we will still need people to get value from what they do. In addition to caring, sharing is work.

I think that a lot of what people do on social media, entertaining their friends, is a kind of work that we don't appreciate. Cory Doctorow's first book, *Down and Out in the Magic Kingdom,* depicts a world of abundance in which the economy is based on reputation, people compete to impress each other, and are paid in a reputation currency.

One could argue that Likes on Facebook, YouTube, and other social media platforms are a prototype of this kind of reputation economy.

It may seem far fetched to think of social media as a kind of work, but I like to point out that we consider a poet or a novelist to be "working," even though their books might sell to a tiny audience, or to no one at all; we consider an actor to be working at their career even if all they do is audition, and put food on the table by waiting tables.

Work is a source of meaning and identity. And we will need to couple that with basic income if it is to succeed.

Finally, I'm not convinced that the robots and AIs are really going to take all our jobs. Evidence from the agricultural and industrial revolutions argues otherwise. But more compellingly, as Nick Hanauer notes, "We're not going to run out of work till we run out of problems."

There are huge unsolved problems in the world today. We have to rebuild infrastructure, deal with climate change, make sure that aging populations get the care they need, feed the billions of new people entering the world and the billions graduating to the middle class, figure out why rich countries are demoting people from the middle class, and much, much more.

That's why I've organized the Next:Economy Summit: to start a conversation about all these issues. We don't have all the answers we need yet, but I'm betting that if we work at it, the next economy we build can be a better one than the one we have today. We have to commit to making it so.

CHAPTER 14

# Technology and Business as if People Matter

*Get the O'Reilly Next:Economy Newsletter and receive ideas and insights on how technology is transforming the nature of work.*

It was 1930, at the start of the Great Depression, when famed economist John Maynard Keynes wrote the following words, in the same prescient essay where he coined the term "technological unemployment":

> We are suffering just now from a bad attack of economic pessimism. It is common to hear people say that the epoch of enormous economic progress which characterised the nineteenth century is over; that the rapid improvement in the standard of life is now going to slow down; that a decline in prosperity is more likely than an improvement in the decade which lies ahead of us. I believe that this is a wildly mistaken interpretation of what is happening to us. We are suffering, not from the rheumatics of old age, but from the growing-pains of over-rapid changes, from the painfulness of readjustment between one economic period and another.…

The essay was called "Economic Possibilities for our Grandchildren."

Keynes was right, and he was wrong. Sure enough, after a punishing depression and a great World War, the economy entered a period of unparalleled prosperity. But in recent decades, despite all the remarkable progress of business and technology, that prosperity has been unevenly distributed.

Around the world, the average standard of living has increased enormously, but in modern developed economies, the middle class has stagnated, and for the first time in generations, our children may be worse off than we are. Once again, we face what Keynes called "the enormous anomaly of unemployment in a world full of wants," with consequent political instability and uncertain business prospects.

***It doesn't have to be that way.***

I launched a new event called The Next:Economy Summit, which aims to help businesses, policy makers, and technologists understand where the economy went wrong and to chart a course from the WTF economy we experience today, full of wonders and horrors in equal measure, to a Next Economy that brings greater prosperity to all.

I'm now planning the second annual Next:Economy Summit, which this year I'll be co-hosting with LinkedIn co-founder and executive chairman Reid Hoffman. Here are some things I've been thinking about and will be exploring further at the Summit this year:

- **In the Next Economy, entrepreneurs tackle the world's hardest problems—before they tackle us!** There are those who worry that as more and more jobs are done by machines, there will be nothing left for humans to do. Yet in the 21st century, we face enormous challenges: climate change, refugees displaced by war and economic inequality, aging populations supported by fewer young workers, new infectious diseases, crumbling 20th century infrastructure, and more. In the past, machinery augmented human labor, making things that were once impossible the stuff of everyday life. We tunneled through mountains and under the sea, brought electricity, plumbing, and instantaneous communications even to remote locations. ***We have to stop worrying about "jobs" and start focusing on how to use the current generation of technology to enable people to do things that were unthinkable in the 20th century.*** As Nick Hanauer has said, "Technology is the accumulation of solutions to human problems. We won't run out of jobs till we run out of problems." I want to showcase entrepreneurs who are making a difference, not just making a dollar.
- **In the Next Economy, creativity—not just efficiency—is the key to competitive advantage.** Even in a world where machines

do many tasks that humans do today, the Next Economy will pay for what is uniquely human. We all crave the human touch, and caring and creativity will be keys to success. People at all levels of society pay a premium over the base cost of goods as a way of expressing and experiencing beauty, status, belonging, and identity. And in our most vibrant cities, a privileged class experiences a taste of a future that could be the future for everyone. Restaurants compete on the basis of creativity and service, "everyone's private driver" whisks people around in comfort from experience to experience, and one-of-a-kind boutiques provide unique consumer goods.

- **In the Next Economy, companies use technology not to replace workers but to augment them,** so that they can do things that were previously impossible. Uber and Lyft drivers can find passengers on demand at any point in the crowded city because they have been "upskilled" by the sensors in their phones and modern smartphone mapping technology. Surgeons partnered with robots routinely perform surgeries that were previously difficult or even impossible. Software robots can sift through mountains of documents no human could read to find the nugget of knowledge that makes all the difference.
- **In the Next Economy, companies create great experiences not just for their customers but also for their workers.** What's more, businesses recognize that if workers aren't well paid, they can't afford to be customers, and that it's simple self-interest to have a fairer distribution of the fruits of productivity. Even with all the controversies about the labor practices of Uber, Amazon, and the "gig economy" as a whole, I believe that we are still in the early stages of the game, and that over time, **creating great places to work will be a locus of competitive advantage.**
- **In the Next Economy, AI and robots take over more and more repetitive tasks, and people work at jobs that our grandfathers and grandmothers would not recognize as work.** When Hal Varian, Google's chief economist, made that remark, he was thinking about his own job. But how about some other jobs that didn't exist even a few years ago? Data scientist, user experience designer, site reliability engineer, social media entertainer, AI trainer…Humans will be working alongside bots, partnering with them, managing them—and sometimes, being managed by them.

- **In the Next Economy, new kinds of technology platforms become the infrastructure of prosperity** in much the same way that roads, electricity, and telephony did in the 20th century, enabling entrepreneurs at all levels of society. I'm not just talking about universal fiber, but about on-demand logistics, real-time skill-matching platforms, online education, peer-to-peer media platforms (aka social media), real-time translation, new mechanisms for financial exchange, assistive AI, self-driving cars, drones, and other forms of universal robotics.
- **In the Next Economy, there are new ways of paying and being paid.** And I'm not just talking about Bitcoin! For so long, we've taken advertising for granted as the primary currency of online media, but there are intriguing new models emerging, from patronage through implicit "reputation currencies."
- **In the Next Economy, individuals cooperate across the boundaries of companies and countries.** I'm asking myself how new networking technologies change the fundamental nature of management and corporate structure.
- **In the Next Economy, policy makers don't just stick to old recipes for managing the economy and providing a social safety net, but try bold new experiments informed by data and reflecting the reality of how people live today.** Universal Basic Income. How might that work? Portable benefits? Makes sense in a world of "continuous partial employment." Drones? We'd better rethink our use of airspace! How do we regulate on-demand transportation, homes turned into occasional hotels, and a future of self-driving cars? We are looking to convene a robust conversation about the legitimate public policy objectives of technology regulation, as well as how to make regulation more data driven and responsive to fast-changing conditions.
- **In the Next Economy, companies recognize that "we all do better when we ALL do better."** "Public benefit" is not a special class of company but the common sense of how to do business. We've realized that our financial markets increasingly reward short-term thinking and that the idea that the only obligation of a corporation is to enrich its shareholders has made some of us very rich, but has made our society as a whole more fragile and our economy less productive.

Technology can make everyone richer. And it is only when everyone is richer, not just a few, that an economy truly thrives. It is our

opportunity—not just our responsibility—to make the economy enjoyed by the rich into the economy for everyone: the Next Economy!


We're assembling a remarkable cast of leaders—entrepreneurs, business and labor leaders, thinkers and policy makers, and hands-on workers—to help us think through the challenges and opportunities of the Next Economy.

If your startup is about augmenting humans so that they can do the impossible, creating amazing experiences for people, solving the world's hardest problems, enriching not just yourself but everyone around you, you are part of the Next Economy. I want to hear from you.

I hope to see you at the event. I'll also be publishing many more pieces on the subject of technology and the future of work on LinkedIn, using the hashtag #NextEconomy.

We also publish related links via @oreillynext on Twitter. You can also subscribe to our weekly Next:Economy newsletter, and send us stories that we ought to know about via *Next:EconomyEditor@oreilly.com*. It provides a wealth of further reading from the community of folks who are wrestling with questions of technology and the future of work.

## About the Author

**Tim O'Reilly** is the founder and CEO of O'Reilly Media Inc. Considered by many to be the best computer book publisher in the world. O'Reilly Media also hosts conferences on technology topics, including the O'Reilly Open Source Convention, Strata: The Business of Data, the Velocity Conference on Web Performance and Operations, and many others. Tim's blog, the O'Reilly Radar "watches the alpha geeks" to determine emerging technology trends, and serves as a platform for advocacy about issues of importance to the technical community. Tim is also a partner at O'Reilly AlphaTech Ventures, O'Reilly's early stage venture firm, and is on the board of Safari Books Online, PeerJ, Code for America, and Maker Media, which was recently spun out from O'Reilly Media. Maker Media's Maker Faire has been compared to the West Coast Computer Faire, which launched the personal computer revolution.