

THE SHARING ECONOMY AND CROWD-BASED CAPITALISM: HOW DIGITAL TECHNOLOGIES TRANSFORM BUSINESS, GOVERNMENT, AND SOCIETY

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This session from the 2017 CFA Institute Annual Conference discusses the following points:

- Crowd-based capitalism is a new way of organizing economic activity that is transforming industries ranging from real estate and transportation to energy and health-care. Small-business financing platforms like Uber, Airbnb, Angellist, and Funding Circle are early examples
 - It is important to analyze the digital and social drivers; draw out the implications for economic growth and the future of work; and look at whether emerging technologies like AI and 3-D printing accelerate or slow this transition
 - Regulatory approaches developed for the industrial era fail when the economy is crowd based, but new digital trust systems and data-driven approaches provide effective alternatives
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ARUN SUNDARARAJAN: I've been a professor at NYU for many years. Throughout that time my interest has been in how digital technologies change things. About six years ago I started to notice a particular kind of change that digital technology was engendering that was different from what I had observed in the past. And at the turn of the century, we saw the digitization of music, of news, of books, of video, and there was an association between digital disruption and the digital industries.

We knew that digital technology was going to change or was changing the business models of products that could be removed from a physical artifact and converted into pure digital goods. But what I started seeing in 2011 was a digital disruption of industries that were very decidedly physical, very decidedly real world. A couple of years later, the term "sharing economy" started to get popular as a label for these changes or these new business models that were emerging.

I wrote a book about this a couple of years ago. I'm happy to see people around the world reading the book. Well, I don't actually know if they're reading the book; I'm happy to see people around the world buying the book. You know, they're buying it in physical form, so we can't even monitor it with reading it.

And when people hear the term sharing economy, some of the companies that typically come to mind are the ride-sharing companies like Uber and Lyft and Go Jack and Ola and Grab. Not so much Didi, although Didi, which is the ride-sharing platform that dominates China is actually by far the largest ride-sharing platform in the world. They offer more than 20 million rides a day, and their scale is just sort of like immense and growing very rapidly.

A lot of other people think of Airbnb, which during its last round of venture financing was valued at a level that was higher than, at close to or higher than the largest hotel chains in the world. For other people, when they hear the term sharing economy they think of bike sharing, they think of car rentals that cities offer on demand like what Singapore is planning to offer. They think of libraries, they think of time banks, they think of food courts. So, the term sharing economy is a very confusing term.

But if you look at the subtitle of my book, I define a different concept, crowd-based capitalism. I'm of the opinion that this is a better umbrella term for a family of changes that we are seeing in how the world's economic activity is organized. So, I'm going to start by explaining to you what crowd-based capitalism is. It's the central idea of my book, and it's a unifying theme that ties together a whole bunch of changes induced by digital technology across a range of industries.

So, how many of you have taken an economics course? OK, good. This is a good audience to ask that question to. How many of you enjoy, how many of you have good memories of this economic course? Yeah. Like those little curves, you know, indifference curves, supply, demand, all that good stuff. But a lot of people who take their first microeconomics course are puzzled by the

characterization of the economy that is embedded in these books because they describe an economy in which you have individual producers who are selling to individual consumers to a market. That doesn't really reflect the reality of the economy that we live in.

But the reason why that is the economy described in these textbooks is that that's what the economy looked like in the late 18th century when Adam Smith wrote *The Wealth of Nations*. These were market economies: individual producers, individual consumers, the invisible hand setting prices. But over the 19th and 20th century, we had the telegraph, we had the internal combustion engine, then along came the telephone, the railroads were built. And then over the 20th century, we created mass production, mass distribution; and managerial capitalism came of age in the second half of the 20th century.

But if you look at things 15 years ago in the major industrialized economies of the world, a vast majority of economic activity is organized the same way. Large corporations that have hierarchies of managers, employing people full time, producing goods and services that they then deliver to consumers. So, this is the dominant model in the world's large economies of how we organized economic activity at the end of the 20th century.

I'm seeing the emergence of a third way that sits somewhere between 20th century managerial capitalism and 18th century market-based economies, Adam Smith economies. I'll give you some characteristics of what this model looks like, and then I'll illustrate them with some examples. What... I mean, one characteristic is a shifting out of the hierarchical organization of a large fraction of the economic activity, often the supply, where instead of people doing things as full-time employees for a large entity, that large entity becomes much smaller.

It becomes the aggregator of demand, the provider of search and discovery. But the actual production and supply seems to move to a distributed and heterogeneous crowd of individuals, some of them larger companies, some of them smaller companies, some of them individual, some casual, some full time, some amateur, some professional.

This often distributes the capital ownership associated with the business enterprise. It often leads to a form of consumption that doesn't involve ownership but is more asset-light where you are getting stuff when you need it rather than owning it. It is powered by a meld of brand-based and digital trust. I'll get to that in a few minutes. And it blurs a number of lines. It blurs lines between personal and professional. It blurs lines between casual labor and full-time work, and it blurs lines between the traditional definition of a marketplace and the traditional definition of a hierarchical organization.

So, let me start with an example that predates the sharing economy. When I was a kid and I watched television, the content that I watched, the content that I consumed, was produced by large companies, movie studios, television studios. And then that content was distributed to me by a different set of large companies, the television networks. I look at the consumption, the video

consumption behavior of my daughter, and the content that she consumes, the video content that she consumes, is still delivered to her by a large hierarchical organization, YouTube, which is owned by Google, but the content that is produced is produced by a dizzying array of people who are connected in this somewhat tenuous way to YouTube.

There are famous musicians. There are movie studios. There are TV studios. There are late night shows, no doubt. There are also professional producers of YouTube content who are making money selling advertising on top of their content, and then there are millions of others who are simply posting content out there without any particular commercial intent. So, there's a video of me hang gliding on YouTube. I put it up there so that I could share it with friends, but I didn't put my privacy settings on right, and now 43 people have watched it. And so you know this is entertainment to someone.

But this theme, this shift of the productive activities of an economy out of the organization and into a distributed and heterogeneous crowd seems to be happening across a range of other industries as well. You can now get a small business loan through a platform called Funding Circle in the UK and other comparable platforms around the world. When you apply for a loan, you provide Funding Circle with pretty much the same documentation you'd give a bank. There's a gap in small business lending, as I'm sure many of you know. It's easy to get credit if you're a consumer, if you're a big business, but not if you're a small business.

But that's where the similarity ends. You provide all this documentation to Funding Circle. The typical loan ask is 50,000 pounds. But the actual funding of the loan is not done by Funding Circle itself, it's done by a distributed crowd of individuals, some professional lenders, some wealthy people who are putting their money to use to grow the businesses in their neighborhoods, and some people who are just taking their savings accounts and redeploying them as commercial loans. Over 200 people fund the typical Funding Circle loan, some lending as little as 20 pounds each. And these are not donations, these are loans that earn 9–14% interest.

You see a similar thing happening in venture capital where platforms like AngelList and CircleUp are aggregating demand for equity venture capital. They are aggregating the business plans and the fake financials that go with these high-tech startup business plans. But the actual funding is not provided by them or by their partners, it is provided by a distributed and heterogeneous crowd of individuals.

Some are professional investors doing it on the side. Some are people who know a little bit about tech, like me, who have said, well let me put this to use by putting a few thousand dollars into a few companies. Some of them are people who might just say, I'm not going to Vegas this year, let's put some money in this high-tech startup.

You're seeing this happen in other asset classes as well. There's a company called Rally Road that is trying to create a crowdfunding market for classic cars. For example, you see this in real estate

as well. But, the theme is the same, where the platform aggregates the demand, but the actual supply comes from the crowd. It's happening in philanthropy with platforms like Kickstarter. It's happening in the rental car business through a dizzying array of platforms around the world, Get Around and Turo in the United States; Start, which used to be [INAUDIBLE] in China; Drivee in France and Germany.

All of them aggregate demand. For you go there and say I want to rent a car. I want to rent it for the following period of time. It gives you a bunch of rates. But that's where the similarity with the traditional car rental company ends, because the actual supply of the cars is coming from a distributed crowd of individuals. Some people are just repurposing their second car — generating a little revenue stream. Some people have bought these really expensive Teslas that they can't afford and are making their payments by renting them out when they're not using them. Some of them are running 5 to 10 cars as a small business through the platform. Some larger businesses that used to be local car rental companies. There's one that has 300 cars that runs its business through the Getaround platform in San Francisco.

It's happening in retail to some extent. But, instead of going to a store, you may go to a crowd-based retailer like Etsy that has 1.2 million sellers who are making and selling stuff. You may go to one of a number of rental platforms where you can rent the apparel or the accessories of someone else. You may go to a platform like Mercari, where people sort of sell stuff that they own, sort of like eBay, but through a mobile phone.

This is happening in professional services where rather than joining a large traditional consulting firm or law firm you can list yourself on a platform like Catalant or UpCounsel. Catalant has over 35,000 professionals now. It's like you're hanging up your digital shingle as a provider of consulting services or of legal services. Gigster, which is a lot smaller, but has some of the highest quality talent that Silicon Valley has to offer in the machine learning, the design of systems architecture. And so it's defining a new way of earning a living if you are an individual who does not want to work for a large company but instead in a crowd-based way wants to attach to a platform that is then aggregating the corporate demand managing the relationships, providing search and discovery.

It's happening in food. I won't get into this, except there's a really interesting platform called Rushke, and it is connecting farmers, and fishermen, and people who produce meat directly with their consumers through a platform. It will happen in the next few years in energy once the battery technology is good enough for us to store power, the solar power, that our rooftop solar panels generate.

At which point, we will see a platform that allows you to pick up a local energy supplier for your neighborhood, not feeding back your excess power into the grid but actually being a power producer for a set of people who are closer to you, thereby gaining tremendous economic efficiencies from both the generation of power in a more efficient way but also minimizing losses in transmission and distribution.

And then, of course, there's the familiar example of Airbnb. This is a good example of cloud-based capitalism because Airbnb does not own — or in some ways it's like a different kind of micro-franchise operation. The traditional hotel business you've built, dedicated real estate that provides short-term accommodation either centrally through a brand or through a franchise. How many of you are staying in a hotel tonight? How many of you are staying in an Airbnb? See, next year a lot more of you will be staying in an Airbnb, especially in this group here.

But Airbnb, to many people it still seems like it's on the fringes despite its lofty valuation. The thing is that — on New Year's Eve last year over two million people were staying in an Airbnb. Just to put that number into perspective — two million people — the world's largest hotel chain is Marriott's Starwood; they have 1.1 million rooms in inventory. And so, sometime this year on a day-to-day basis Airbnb will be, on a daily basis, the world's largest provider of short-term accommodation. So, this is sort of decidedly away from the fringes and has become a mainstream model of providing short-term accommodation. And Airbnb's growth trajectory suggests that over time it will be many times bigger than any single hotel chain.

So, across these industries, we are seeing this model of crowd-based capitalism emerge. It falls under the label of the sharing economy, which is why I called my book *The Sharing Economy*. But the message to take away is that this is a new way of organizing economic activity. Crowd-based are replacing centralized hierarchies, but there are accompanying sort of hierarchies like Airbnb that aggregate demand then connect to the crowd.

And my final example will illustrate why this particular model has emerged today. Why is it that over the last five or six years, we've seen an explosion of these platforms, while the commercial internet has been around for over two decades?

And this final example is a company called BlaBlaCar. How many of you have taken a ride in BlaBlaCar? Well, BlaBlaCar doesn't operate in the United States. One person. Wonderful. But they operate in 22 other countries. They're headquartered in France. Their largest market is Russia. They allow you to sell empty seats in your car if you are traveling from one city to another.

So, let's say you are driving from Paris to Leon. You're driving your BMW 7. I live in Manhattan; I don't own a car, so I stumble over describing car models. You're driving your Tesla, let's say. And, you know, you're driving by yourself. You can list the empty seats in your Tesla on BlaBlaCar. You can say, it's a Tesla, I've got great air conditioning, silent engine, I play soft jazz, I don't smoke, I keep the windows up, you know, I don't talk too much.

They've even got ratings for drivers. You can rate yourself blah, blah blah, or blah, blah, blah. And then there might be someone — and this is 35 euros — there might be someone else who doesn't drive in my Prius. I'm going to have the windows down; I play like "The Master of Puppets" throughout the entire drive; there's no leg room — and it's eight euros a ride.

And so what BlaBlaCar is trying to do is create a crowd-based version of building a national rail infrastructure. And what I'm going to illustrate in the next video is a day in the life of BlaBlaCar. So, for those of you who are in the room, the blue dots that you're seeing on the screen are measures of individuals using spare capacity in other people's cars to get from one place to another. In any given three-month period, there are five times as many people who travel on the BlaBlaCar network as there are on the French railroad Eurostar. You add up the number of people who travel on BlaBlaCar every day, it is double the number of people who travel on Amtrak every day.

And so without a single dollar of investment in steel or concrete, BlaBlaCar has created the capacity of a national rail network. And this is another example of crowd-based capitalism, and it raises the question of how are they doing it. How are they managing to get people to take that leap of trust to be able to get into a stranger's car and say drive me to another city? I mean it's one thing to get into an Uber or into a Lyft, right? I mean, the distances are short typically. But with BlaBlaCar, you're actually spending several hours on the highway with someone you don't know. And it fascinates me that they have managed to build enough trust into the platform to allow people to make this leap.

So, BlaBlaCar and Airbnb, and many of these platforms use a combination of cues to allow people to make that commitment. It's the willingness to commit to a collaborative effort when you don't know how the other person is going to behave. Right? I mean this is fundamentally what trust is. So, some people rely on verified government IDs. You've brought online that government ID sort of form of trust. You can hold your license up in front of a webcam, and it will verify it in 30 seconds. Some people rely on the person's Facebook or LinkedIn profile, and these represent real world social capital and professional capital that has also been digitized and brought online. Some people rely on the peer feedback. This has existed for over two decades, where you learn from the experiences of others.

But there's an array of different things, digital cues, that may cause people to trust other people. Some people trust other people if they belong to the same auto club. Some people trust other people if they are blood donors. And so as we digitize more and more information and make it available, and make this variety of information available, what we end up with is a system where you can place the same level of trust that you used to place in a peer who was known in a whole crowd of people who you may not know as well. I mean we've gotten better in many ways at reading these digital cues because we've been reading Yelp reviews. We've been reading Amazon reviews for over a decade. Each of us reads them in a different way, but put together, we've each developed our own ways of assessing the trustworthiness of something we don't know through some combination of digital information.

So, I've surveyed BlaBlaCar users in 11 different countries. One result that sort of jumps out across all 11 countries is that the level of trust that a BlaBlaCar user places in someone they don't know but who has a full BlaBlaCar profile approaches the level of trust that they place in their friends

and family, and it's higher than the level of trust that they place in their neighbors and colleagues and way, way higher than the level of trust that they place in a social media contact, which is 16%. So, it's not blindness to trusting people digitally. There's something else that is being constructed here that is very different. And one explanation for this could be that people who use BlaBlaCar have just really lousy colleagues and neighbors. That's sort of one explanation that I've considered, but it seems like there's something deeper going on here.

And what seems to be going on is that in the evolution of trust systems that powered the economy over time, we're inventing a new one. We used to trust people in our local communities and villages. You don't buy milk from the person in the neighboring village because you don't know if it's milk or it's something else. And then along came government standards, laws against adulteration of food, standard weights and measures. These expanded to some extent the level to which you could trust someone you didn't know enough to engage in commerce. These evolved into institutions, courts, contracts, property rights. That scaled commerce, allowed you to trade at least with large entities that you didn't know. But the cost of writing a contract is expensive. You don't want to go to Starbucks every morning and sign a contract and then hold them to it if the coffee quality is not good enough. And so over the last 50 years, we have increasingly relied on brand for those small sort of... like those small unit transactions where you know you need some level of trust in order to make that choice.

I feel like we're at the cusp of inventing this fifth form of trust economywide, and I've been interested in trust my entire career because I believe that if you understand the evolution of trust, you understand the evolution of business. And so when I see a new form of trust emerge in a population scale across a range of industries, it makes me believe that much of the world's economic activity will be reorganized over the coming decades as these trust systems mature, as our comfort level with them matures. Maybe, we don't trust these systems enough to choose a health care provider through a digital platform or to call a registered nurse when you cut your finger while you're cooking. You still go to a hospital or to a clinic, but maybe that level of trust will be there in five years. Maybe you will trust the platform enough in 10 years to get your electricity from them. And so, it's something worth keeping an eye on. So that's the sharing economy.

I don't want to take too much more time because I want to leave a lot of time for questions. I see the question cards are sort of piling up. So, I'll spend a couple of minutes on some key economic effects. I've done some studies of what happens to an economy as it transitions from the industrial capitalism to the crowd-based capitalism model. My models suggest that this leads to a greater rate of economic growth. It comes from increasing the impact, so to speak, of capital when you distribute it into a crowd of people who are often repurposing a personal asset for commercial use. It comes from creating a greater level of variety, which leads to greater consumption. You contrast the variety that's available on Airbnb with the variety in a hotel chain, and that starts to make sense. I mean, a couple of years ago Airbnb reported that 90% of all Airbnb stays were not substituting hotels, but were in fact sort of new demand that was generated because of the variety of the cost.

There's this behavior of people buying things that are better than they otherwise would have been able to afford because they can repurpose them as commercial assets on the platforms. So, the Tesla drivers who are renting out their places on Getaround, the people who factor in the Airbnb revenue that they can get from their home when they decide on how much of a mortgage they can afford. So, this sort of is uplifting in a certain sense for people who tend to not gain the benefits of digital transformation traditionally.

And the story that seems to emerge is one of inclusive growth. Yes, there are billion dollar platforms created, but unlike sort of priors, sort of digital transformations, you are also creating in parallel millions of small business owners who are running tiny stores through Airbnb. I'm sorry running tiny short-term accommodation businesses through Airbnb, running tiny stores through Etsy.

All right, so you often probably hear about the sharing economy in the context of the regulatory challenges that it faces. If you think about this transition, I talked about the blurring of lines between personal and professional; let me explain what that as a way of motivating why we need new regulatory frameworks. So, how many of you have picked up someone from the airport or a train station in your car? OK. I mean many of us have picked up our friends, kids from soccer practice, and this is pretty high stakes transportation activity, but you don't really need a new permit for that, or a special permit. How many of you have cooked, prepared a meal for a friend in your home? OK. How many of you had to get a special government permit for that? No.

How many of you have had someone stay in your home, a friend or a relative? OK. How many of you have lent money to a friend? This is where someone gets up and leaves the room whenever I ask this question. It's always like you know I — but these are activities that fall under the commercial, I mean, the personal umbrella, right? I mean, these are things that we do for personal reasons. We don't try to make money off of them. There may be the risks involved with them, but in society's definitions these are personal activities and it's fine to do them.

On the other side, you have commercial, professional providers. You have taxi drivers. You have bed and breakfasts. You have restaurants. You have small business lenders. What the sharing economy does, is it blurs these lines between personal and professional. When the person who used to have houseguests is now an Airbnb host; the person who used to be a dinner party thrower is now running a supper club in their dining room; the person who used to lend money to friends is now a small business lender on Funding Circle. People who used to give other people rides are now moonlighting as Lyft drivers.

And so, our regulatory frameworks for commercial activity are set up largely with the expectation that there is a large, full-time professional commercial entity on the receiving end, and they are struggling to accommodate this new family of providers. And, the solution that I consistently prescribe is to think of the platforms themselves as part of the solution to this regulatory issue. Don't think of the platforms as the entities that need to be regulated. Don't think of them as the

protagonist in this regulatory drama. Think of them as partners who should be required to play a role in regulating the commercial activity that they facilitate.

This is not an unusual idea, that we delegate something that used to be done by the government to a platform. De facto, we have gotten used to that progressively in on different facets of our existence. Over the last decade, I mean, Google and Facebook have unprecedented sort of observational surveillance capabilities on what we do. They far outstrip the capabilities of many governments.

When you buy a book through your Kindle, what you can and can't do with that book isn't governed by copyright law, it is governed by the licensing agreement that you've signed with Amazon. So, Amazon has taken over the mediation of division of rights between producers and readers. The same thing as video content and music through iTunes. And so, across a different range of industries, we've already gotten used to this notion that the lines between platforms and governments are blurring.

And the opportunity here is that, say, 20 years ago you might have needed a taxicab regulator to actually do all of the regulatory activities associated with taxi because otherwise people wouldn't feel safe getting into them. Now you have a new third party like Lyft, or like Uber, like Didi, or like Grab, or like Go Jack. And so it seems natural to see what they're — what are the market failures that we needed government intervention for that are now naturally being solved by the platform. And more importantly, what are the things that you still need intervention for that you might be able to delegate to the platform instead of involving the government.

So, this doesn't mean that there's no role for the government. In fact, regulation — there's going to be more regulation rather than less because of the sharing economy because of the sheer variety of commercial activity. But what we think of as regulation, the shape that regulation takes, is also going to change, and the entities that are the regulators are also going to change.

A particularly compelling kind of solution that I think has a lot of promise for the future is of delegating the enforcement activity to the party that holds the best data. Rather than asking a platform to hand over data out to the government and have the government do the regulating, why not instead let the government set the rules if it wants to, but then let the regulatory agency set the rules, but then hand over the responsibility of enforcing these regulations to the party that has the best data to detect and correct whatever needs to be detected and corrected?

So, we're seeing small steps towards this. Instead of setting up a registration system through which they collect tax from Lisbon hosts, the city of Lisbon has delegated the responsibility of tax collection to Airbnb. This is a trivial activity in some sense, the complexity of this is trivial. But it's an important first step towards Airbnb gaining credibility as a regulatory partner. A more, a greater step forward in this kind of data-driven delegation, the cities of London and Amsterdam, who have delegated the responsibility of enforcing 60- and 90-day limits on Airbnb hosting, to the

platform Airbnb, rather than saying hand over the data to us and we'll monitor, they've said you're responsible for monitoring, you are responsible for blocking someone once they hit that 60- or 90-day limit.

There are other kinds of data collection that other cities like Chicago, San Francisco, and New Orleans are delegating to Airbnb. There is a set of rules about the fact that Uber and Lyft drivers shouldn't drive more than 12 hours. But I think that there's a lot of potential for data-driven delegation wherein rather than asking these platforms to hand over the data to the government, you force them to sort of create some sort of shared system where they are monitoring in real time and then just blocking people once they hit that 12-hour limit.

Even for more complex problems, like the issue of many Airbnb guests feeling that they are discriminated against when they look for properties through the platform, this is also the kind of thing where I feel that data-driven delegation has a lot of promise. Simply because a platform has far better data, far more granular data about what pages are people browsing, the actual click-by-click activity to be able to build machine-learning systems that detect any form of ethnicity-based discrimination. This richness of data far outstrips any sort of government led, "hand over the data to me and we'll detect it" that you might imagine.

It's not unlike the fact that over the last 20 years, credit card companies have created a whole new field of fraud detection because the incentives of the regulation caused them to want to detect fraud. So, they use every piece of information that's available to try and detect and correct credit card fraud, and they've spurred a lot of innovation and fraud detection that wouldn't have existed if they had some sort of standard reporting system that placed the burden of fraud detection on the government. So that's a good example of data-driven delegation in action.

Of course these platforms have to be credible. They have to make sure that as they are given regulatory responsibility, that they are perceived as legitimate. This is a lesson that we've learned from self-regulation in other industries, financial services, nuclear power, cotton chemicals. The IMPO which regulates nuclear power in the United States is generally viewed as a credible regulatory agency. The CEOs lost their jobs in the late 1970s because of actions taken by this. And perception of legitimacy and some power to be able to actually be a credible regulator, these are two important characteristics of a system where some of the regulatory responsibility is delegated to the platform.

All right, so I'm going to conclude with a couple of comments about the future of work. And then we'll take the many questions that you guys have sent in. Through a number of examples, whether it's hosting on Airbnb, selling on Etsy, offering your legal or consulting services through UpCounsel or Catalant, it seems to me that there is a new kind of relationship that is emerging between individuals and institutions which is very different from the employee–employer relationship that dominated the second half of the 20th century.

At the beginning of the 20th century, actually like 41%, I think, 50% of the workforce was self-employed in some way or the other. Even if you cut out the farmers, it was 30%. The fact that the dominant form of earning a living as an individual is providing labor and talent in exchange for a salary is a relatively recent phenomenon, and we're seeing changes that are occurring independent of the sharing economy by different studies last year have documented the extent to which work is now non-employment. The fraction of the workforce engaged in some form of non-employment work arrangement, generating either all or part of their income through some work arrangement that is not employment, has risen to by McKinsey's estimates over 40% of the U.S. workforce now. About half of them, this is their primary source of income. For the other half, it's a secondary source of income.

And so, as we create this new individual–institution relationship, a critical policy challenge that we're going to face over the next couple of decades is re-creating and funding the social contract that we have admirably associated with full-time employment over the last 50 or 60 years. So, when you work for someone full time you get benefits, you get income stability, you get health care, you get paid vacations, you get time off when you're not well, you get time off for sort of family events, you get mechanisms by which you can plan for your retirement. All of these are tied or biased towards one work arrangement, the work arrangement of full-time employment.

They're not inherent to full-time employment. If you read *The Jungle* by Upton Sinclair, it describes full-time employment 100 years ago, and it was not a pretty picture. But over the last 100 years, through labor activism, through government, through the evolution of society, we have really constructed this contract around our dominant form of work, full-time employment. Now we have to decouple it somehow from that one model of work and prepare for a future where different people will be using different work arrangements, many of which will be non-employment, but should still be able to attach these things that are aspirational to any human being, the stability, the insurance, the protections, the paid vacations, all of these things.

And this is going to require a government change. It's going to require new funding models. To me, it's something that is incredibly important, because digital transformation has extended out of the digital industries and into these real world industries. And if we don't pay attention, gradually it'll probably slip away. And then in 20 years, we'll look back and say what happened? Where have these things that we consider signs of progress, where have they gone?

Anyway, so that's the point at which I'm going to stop. I don't have business cards with me, but this is where you can find me if I don't get to answer your question during the 15 or 20 minutes that we have left. Thank you for your time.

[APPLAUSE]

ARUN SUNDARARAJAN: Allison, why don't you come up? I'm going to stay standing actually because I — you can sit here.

ALISON GRISWOLD: I was supposed to note previously that Arun will be signing books following his session. That book. So, you talked relatively little about Uber, but Uber is often held up as sort of the archetypal sharing economy company, and I was wondering what you think of this sort of Uber for x model of companies that have tried to be like Uber and other industries?

ARUN SUNDARARAJAN: Well, I'll answer two questions that you seem to have asked. One is the implicit question of why did you talk so little about Uber? And the answer to me is that I think that in the world of on-demand transportation, ride-sharing, the crowd-based model that we see dominating today — there are 15 million Didi drivers in China, there are millions of Uber drivers around the world, there are millions of Lyft drivers in the United States — is a passing phase. And it will evolve as cars get autonomous, into what will largely, at least initially, be a centralized form of on-demand transportation.

Now, the auto industry is going to be disrupted massively. This is like a \$15 trillion dollar industry worldwide. It's like orders of [INAUDIBLE], at least an order of magnitude bigger than advertising, whose disruption has produced Facebook and Google. And so, there are many big companies that will emerge. I think the brands that have digital trust, the ones where we can trust their software, are going to be the ones that win in this shakeout between the Googles, and the Didis and the Ubers, and the Teslas of the world on one side, and the Fords, and the GMs, and the Daimlers on the other side. And the on-demand model is probably going to dominate, because there's going to be a complex of regulations that will have to be embedded into a platform to allow the fully autonomous vehicles to come on the road.

And so that's partly why I didn't speak so much about Uber. It's also because you don't need to come to a session like this to hear about Uber, so I focused on the stuff that was non-Uber. On the Uber for X model, well, I think my view is a little more optimistic than yours. I'm familiar with — well, why don't you tell us what your view is, and then we can sort of follow that up with what my view is.

ALISON GRISWOLD: OK. Well, I write about many of these companies for my job at court, and many of them have struggled to apply the Uber model to other industries because the Uber model is fundamentally one where you have relatively thin margins, but you have extremely high volume. You do a lot of rides, and you only make a little money on each one. And some of these other services that have come up, like the cleaning services, the food delivery services, other related things, they can't achieve the same volume. So, when they also have thin margins, they struggle to make the business work.

ARUN SUNDARARAJAN: Yeah. No, I agree with the fact that a lot of these models are going to be high volume, low margin. And, that doesn't necessarily mean that the model doesn't work, it just means that it's different from the Microsoft Windows model where the margins end up being higher because of network effects. And there's this mythology that network effects in their

purest form are associated with all of the sharing-economy platforms. Facebook has really strong network effects, more value as more people join. Android has really strong network effects. More people adopt the operating system, the more people build applications for Android, the more valuable Android becomes. EBay has very strong bio-supplier network effects: the more sellers there are, the more buyers value the risk to buyers, the more buyers there are, the more attractive it is to the seller at a global scale.

But as platforms like Uber or Handy, which provides cleaning services, or Postmates and Door Dash, which are delivery services, their network effects are extremely localized. If you are the dominant cleaning service provider or on-demand transportation provider in New York, that does very little for the customers in L.A. You can have one service dominating in Mexico City, another service dominating in Toronto, a third service dominating in New York. And so, Uber is as dominant as it is in part because of traditional, 20th century models of gaining scale, access to capital, operational scaling, speed with which they expand into new markets. The inherent underlying network effects are not that strong. And so, I don't think that they're going to be enough to sustain really high margins.

That having been said, I still think that there is a good model for things that involve people going into your home. They may not be trillion dollar businesses, but there are certainly sort of a few good multi-billion dollar businesses in the home services front, on the park-your-car valet on-demand. Maybe not laundry on-demand, I'm not so sure anymore. But, some good pockets of opportunity do exist there. As we know there has probably been over investment in this space. I see like 10 or 12 questions.

ALISON GRISWOLD: There are a lot. We've got a lot to go. Several people —

ARUN SUNDARARAJAN: Ask me the nice ones first. Anything that starts with —

ALISON GRISWOLD: That's not how it works. That's not —

ARUN SUNDARARAJAN: Anything that starts with I disagreed completely with everything that you said, but...

ALISON GRISWOLD: [LAUGHTER].

ARUN SUNDARARAJAN: ... maybe you can redeem yourself by answering this question.

ALISON GRISWOLD: So several people are wondering if you think there's an industry that is sharing-economy proof?

ARUN SUNDARARAJAN: Is there — I used to actually. I mean I used to think that mass manufacturing was sharing economy proof. It seemed like one where — there is 3-D printing technology, additive manufacturing that can decentralize manufacturing to a crowd of people, some of whom own 3-D printers, other who just go to the 3-D printing shop in their neighborhood, but the economics seemed like they wouldn't work out for mass-manufactured products. But the pace of progress in 3-D, in additive manufacturing, has made me sort of reconsider. I mean, there are certainly still things that are going to be manufactured centrally, but there will be pockets of even mass manufacturing that go down the route of sharing economy.

My definition is broad so I do include certain slices of health care as well. I don't think that we're going to choose a crowd-based solution for open heart surgery anytime soon. We're still going to be going to hospitals. But what a hospital is will change, there will be a decoupling of a lot of non-essential, non-emergency services into platform-based stuff. So I don't think any industry is sharing-economy proof, but I think that the extent to which it will change different industries will vary.

ALISON GRISWOLD: OK. We also — we have a lot of questions about your points on trust. And, several people have asked whether you think trust is lost faster than it's gained, and what might happen after a Chipotle E. coli style incident in a sharing economy?

ARUN SUNDARARAJAN: Well, that's a good question because it's still pretty stunning to me the extent to which people trust strangers through these platforms. I don't disagree with their choices. I just sort of — I'm struck by how rapidly this trust has been built. And, especially against the backdrop of falling trust in general, in the United States and elsewhere. There's a metric of trust, the General Social Survey, that captures how much do people trust other individuals in general and society, and that has fallen from about 50% in 1972, people are trustworthy in general, to about 30% last year. And the fall for people under the age of 35 has been particularly acute from, about 45% to under 20%. But at the same time, it seems like we're seeking other ways in which we can trust, and we are more and more sort of comfortable with the digital technologies building up this trust.

Airbnb has already faced a few of these incidents. And if you remember, on an early slide, I talked about the mix of brand and digital, we're still in the phase where there's sort of not really a — I don't think anybody is betting the store on a purely digital trust-based system. I think that the fact that you have this hierarchical intermediary, that if someone cancels your Airbnb, your booking, on you, they will find you another place to stay. If someone trashes your apartment as a host, they will sort of step in and provide. And these things have happened. People have been bitten by dogs. People have faced situations where the trust has not, the digital trust has not covered every single eventuality, and at that point, the platform, a smart platform will step in and provide traditional sort of corporate-type trust. And so, the fact that Airbnb is growing so rapidly despite a few of these incidents suggests that the model is resilient to a few incidents as they decide what the right mix of brand and digital is.

I haven't encountered any situations in over 40 million rides on BlaBlaCar as yet, and so it remains to be seen if that is sort of resilient to some sort of disaster-like situation. But, my take is that, yes, it will sort of slow the progress. It will give people pause, but so long as the platform is smart enough to intervene in the right way — in the same way that a smart company intervenes when you have a product recall — so long as they've got that plan down fine, they'll be able to continue growing after a reasonable period of time.

ALISON GRISWOLD: OK. The pessimistic crowd in the audience would like to know whether there are dangers of overrelying on some of these sharing economy based transportation systems instead of public transit? And relatedly, who are the biggest losers of crowd-based capitalism?

ARUN SUNDARARAJAN: OK, well, there is a danger in — there's an opportunity and a risk. The opportunity is especially for small to mid-sized urban areas where the justification of spending sort of hundreds of millions or billions of dollars on train-based public transportation just does not sort of make economic sense. The sort of variable capacity, ride-sharing type form of transportation can end up being a good alternative to driving everywhere yourself. I think the opportunity is particularly strong there. It also allows you to deal with unexpected demand spikes. You saw BlaBlaCar absorb a lot of the travel when the French trains went on strike multiple times, as they have over the last few years. Tokyo is thinking about how can we use shared-economy models to provide transportation for the 2020 Olympics to avoid overinvestment in infrastructure.

I think the risks here are the exclusion of, in some ways, the slice of the social economic distribution that is on the left tail. And, that's a real risk. Even if on-demand ride-sharing type transportation gets affordable for a lot of people, it may not be as affordable as sort of buying a metro card. And so the kind of intervention we need there is a universal access type intervention, an inclusive access type intervention, that is somehow subsidizing access for the people who can't afford the slightly more expensive public transportation. But so long as we go down the path of getting there, I think that there's a lot of opportunity, especially as the cost structures fall when cars become fully autonomous over the next 10 to 20 years, as they will.

What's the biggest risk of crowd-based capitalism? Well the — I guess there are two. One is that we're careless about not reconstructing the social contract, leaving a larger and larger fraction of the workforce unprotected. But the other sort of bigger lurking danger to me is that we don't favor strongly enough the models that are truly decentralizing capital. So, what I mean by this is that there are some platform-based models that are essentially labor on demand, you're providing your labor and talent through a platform. There are others where you are genuinely creating capital. You're genuinely... you're setting prices, you're deciding on inventory, you're building a micro brand through the reputation system, you are doing merchandising. So, you're building something that resembles a tiny business.

And we have to make sure that we favor the platforms that are genuinely decentralizing capital. And this is particularly important because as both artificial intelligence and robotics enabled

automation, but also more mundane forms of digitally enabled automation stuff, to accelerate the rate at which humans are displaced by digital technology, the model of earning a living as a labor and talent provider is going to be increasingly challenged. The idea that you can supply your labor and talent and get a salary in exchange I believe is under threat because of the improved cognitive and perception capabilities of artificial intelligence. And as a consequence, we need a new model that allows someone to earn a living as something other than a labor and talent provider. So, this is a huge opportunity that crowd-based capitalism presents. But we've got to make sure that the right models survive.

ALISON GRISWOLD: So, I think we have one more brief question maybe.

ARUN SUNDARARAJAN: OK.

ALISON GRISWOLD: Unless you want to —

ARUN SUNDARARAJAN: Oh, no.

ALISON GRISWOLD: OK. So how would you position yourself as an investor for a crowd-based capitalism, and do you think there are perils of a winner-takes-all dynamic?

ARUN SUNDARARAJAN: The winner-take-all dynamics are likely to emerge, for example, where supply and demand aren't co-located. Like, I mean... so, much more likely in the Airbnb model than in the Uber model. So, I don't see this as a peril. We're used to a winner-take-all dynamics now, and we've gotten a sense for sort of how to deal with it. There's economics research from 40 years on regulating monopolists right. We just have to apply that right to this new generation of platforms.

As an investor, I would look at three sectors. I would look at, well, you can always look at on-demand transportation. There's still room for growth there because the underlying industry is just so immense. But beyond that, I'd look at health care, especially sort of low-end health care, sort of non-complex health care. I'd look at energy, energy supply, especially in emerging markets where the traditionally provided power isn't quite as reliable as it is, say, in the United States or Germany. And I'd look at professional services. Professional services platforms I think are going to proliferate any profession that is not central, inextricably intertwined with the operations of a company, but is often on the fringes, like legal services, accounting services, financial analysis, law, sales, consulting.

I think that there's a huge opportunity for platforms to start to peel off some of the best talent by returning them a much larger fraction of the value that they create, while maintaining large corporate relationships so that you're not sort of stymied in the same way that you are if you're running your own tiny business and doing your own individual, small business marketing. So, you get the best of both worlds while retaining a large enough fraction of the earnings that you get relative

to if you're a full-time employee. So, professional services platforms, health care, energy. And, if you have an appetite for risk, on-demand transportation is going to keep going.

ALISON GRISWOLD: All right, well that is our time. So thank you to our live audience for joining us this session.

ARUN SUNDARARAJAN: Thank you.

ALISON GRISWOLD: Please tune in to the rest of the Virtual Link.

[APPLAUSE]