



## In Conversation with Mark Zuckerberg

### Speakers:

Mark Zuckerberg, Founder and CEO, Facebook

### Moderator:

[David Kirkpatrick](#), Founder and CEO, Teconomy Media

(Transcription by [RA Fisher Ink](#))

**Kirkpatrick:** I'm so excited to have Mark Zuckerberg joining us. I met Mark ten years ago, September of 2006, when Facebook was little more than two years old. Newsfeed had been introduced a few days previous, and he was in the thick of this massive pushback from his members. Yet he was cool as a cucumber, and he still is as you'll see, I imagine. If he's back there, if he can come up. But at that time Facebook had nine million members, and now Facebook is approaching two billion members, or users as they're known. Hey!

**Zuckerberg:** All right, Hey! [Applause]

**Kirkpatrick:** I was just saying, Mark, that when I met you FB had nine million users and now it has close to two billion—so things have changed slightly.

**Zuckerberg:** It's been a busy decade.

**Kirkpatrick:** And I wrote a book in the interim, called "The Facebook Effect." Thank you so much for being here.

**Zuckerberg:** Glad to.

**Kirkpatrick:** There are so many things to talk to you about it's almost beyond belief and I've tried to limit them. But I want to start, given that we are in this bizarre moment in history with an election having just happened, asking you: how do you respond to the fact that Donald Trump has just been elected President of the United States? What do you think it means?

**Zuckerberg:** Well, we have a lot of work to do. [LAUGHTER] But that would have been true either way. I don't want to downplay the impact of this, because elections have serious consequences for everyone in the country and probably around the world. There are a lot of people who are pretty happy about the result and a lot of people who

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are upset. One thing that I think it's easy to lose track of is that most progress, I think, is made by private citizens. There are a lot of people all around the world who aren't in the US. There are a lot of people who are not part of the government. There are companies that are pushing stuff forward. There's technology and infrastructure that is getting built out over time more and more.

And that progress will continue, and I think that that's been a theme of this conference. That's certainly how I think about it. I know a lot of the long-term things that I care about around improving education, about curing diseases, and connecting people, developing AI that can not only make Facebook better but can save people's lives and building the next computing platform in VR—these are all things that I think we're going to be able to keep pushing forward and making progress on. We've been working on a lot of them for a while and often not with the government, although sometimes partnership can be helpful there. I think those are the things that we're working on. And I think the things that others are working on are going to keep on making progress, too. I don't want to downplay this, these elections. There's a reason why they get so much coverage, is that they make a real difference in the world. But I also think it would not be right to suggest that it changes the fundamental arc of technology or progress or anything like that over time. If you are a Trump supporter you don't need heartening, and if you aren't, then hopefully that can make you a little bit optimistic about the progress that we can continue making.

**Kirkpatrick:** Well that was a very good way of turning that question into a really good general opening statement without being too committal on the election outcome, which is politic, given your role and I don't blame you for that.

Facebook is such a data-driven company. You guys are always all over the data. One of the things I was wondering, since no one saw this coming, is what is widely said—even the Trump campaign itself thought they were going to lose. Did you have any inklings based on the data that you have, that this might be the outcome?

**Zuckerberg:** Not really. One of the things that I think you learn by building these systems is that the systems are very specifically designed to understand something and do a specific thing. We designed Newsfeed to try to show people the content that's going to be the most meaningful and interesting to them. We designed systems like "People you may know" to help people connect with the people they're going to care about. There's not really a way that a company like ours would just happen to know something like that: in order to know that you would have to go specifically dig into it.

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**Kirkpatrick:** But you could measure the number of Trump related posts vis-à-vis Hillary and the relative enthusiasm could be measured. I can imagine ways that you could figure that out.

**Zuckerberg:** We could do that, but anyone else could. I can rattle some stuff off the top of my head here. It's not news that Trump has more followers on Facebook than Hillary does. I think some of his posts got more engagement. Anyone could have looked at this before. And I think some of those themes you saw in other elections around the world, as well.

**Kirkpatrick:** That's true, although you have a lot more data than is available to the public of what's happening under the covers at Facebook. I want to talk a little more about the Newsfeed because one of the things that really is extraordinarily changed from when we first met, and even when I reported on my book and spent a lot of time talking to you, seven and eight years ago, is that Facebook has really become, effectively, the primary source of information and flow of news and information to a very large percentage of the American public and the public in the world: the population of the planet. The Newsfeed is this enormously influential vehicle for the transmission of information. How do you think about what it is today and where it's going and what the responsibilities are that you have as a result of that enormous influence that it has.

**Zuckerberg:** Newsfeed is probably the most important product at Facebook. As you know, it actually wasn't part of the product at launch until a couple of years in. I think we first met right when the first protest was happening around Newsfeed. We had about a million people who were using Facebook at the time and 100,000 people actually protested it when we started it, it got off to an inauspicious start. [Note: the correct figure is about 9 million users at that time, and about one million protesting.] It's grown into something that more than a billion people look at every day. Use it primarily to connect with friends and family. There's a lot said about the role of news and news content there and that's an important part, but that isn't most of what people are doing on Facebook. Most of it is connecting with friends and family.

The way that we think about Newsfeed is our job and our goal is to help give people the content that's going to be the most meaningful and interesting to them. There's always a way to make the system smarter and better. Let me take you through a brief history of the product because I think it's pretty interesting. Early versions of Newsfeed, we've had different versions of ranking since early on, but we've played around with a version for a while that wasn't ranked, it was just chronological. What we found was that didn't provide the best experience for people. We'd get these reports where

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someone would say, “my cousin just gave birth and they posted a photo of their baby and I missed it because that happened five hours ago, and Newsfeed was chronological and all these less important updates were at the top.” So, that was a bummer. So then we realized that ranking really is better. And all of the metrics reflect that.

**Kirkpatrick:** You have to make judgments like that.

**Zuckerberg:** We started off with ranking that is largely based on the simplest engagement signals that we have in our system. How many likes does a post get? How many comments or shares? Or how much do people click on them or read a news item? That improved things a lot, that was much better than chronological in terms of delivering a high quality experience. A post of something that is important in someone’s life is typically going to get more engagement so we know to show that more prominently, but that’s not perfect either. There are always things, like click bait for example, that might get people to click on them but then they don’t feel good afterwards.

We’ve actually moved away from that model, having Newsfeed be ranked primarily be based on those end product engagement signals. Now we have this Newsfeed quality panel where we actually have thousands of people who come in, and we show them Newsfeed stories and ask them to rank them themselves. That way we have a sense of what sort of a ground-truth quality is that people care about. As time goes on we’re always trying to incorporate more and more signals into the mix. Take something like click bait, which we’ve been pretty actively trying to fight. Getting a sense from people directly as to what kinds of stories they think are click baits, that way we can show people more of what’s meaningful to them, has dramatically improved the quality.

I would imagine that there are probably a number of signals that we can add going forward. There will always be more. I view that as our job: to have the fullest idea of how people actually value the different content, what people find meaningful and important in their lives.

As a matter of fact, one of the things that we ask is not just how you rank the stories in your Newsfeed, but, “of the five most meaningful things that you saw in any media today, how would you rank the things that you’re seeing in your Newsfeed versus some of the other things”? We want to make sure that not only are we getting the items that are on Facebook right, but that we’re actually showing people the things that are going to be the most meaningful to them. It’s a big thing. There’s a lot more improvement

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that I think we can make, and that's why you shouldn't be surprised when you see us continuing to improve the algorithm and make changes.

**Kirkpatrick:** Aren't there thousands and thousands of parameters in the algorithm? They all intersect with one another so that there's a very complex set of calculations that are being made for each individual.

**Zuckerberg:** Yeah, and it's a modern AI problem. The Newsfeed ranking is an AI, one of the things that that allows it to do is to consider many more factors than a person looking at it might be able to. You basically take the signals that people tell us that they want to see in Newsfeed and you bake that in, and that's the ground-truth for quality for feed.

**Kirkpatrick:** One of the things post election—you've been getting a lot of pushback from people who feel that you distorted the way that people perceived the information during the course of the campaign, either because of a filter bubble effect or because you didn't filter out enough fake stories that might have been published simply to gain traction and sell advertising that might have been distortive of peoples information that they perceived. One of the things that I always wonder: I'd love you to talk about both of those issues. You once said to me that Facebook might turn out to be the most transparent company in history. I don't know if you remember that, but I was so excited when you said it because I thought that was such a great idea, because I always believed that your company would have inordinate influence in the world, partly because you're such a good leader and because it was such a good idea. Obviously it's continued to be successful but what goes on under the covers is not very well understood. Could we come to understand it better so that people would be not so suspicious about things like those I mentioned?

**Zuckerberg:** When it comes to Newsfeed ranking I actually think we're very transparent. Every time we add a new signal or make a change, we publish that. We explain why we're doing it and what signal we're adding, and we bring people in to talk to them about it. That stuff is out there, and we'll continue to do that. That's a big part of what we do and we take that seriously.

I've seen some of the stories they're talking about around this election. Personally I think the idea that fake news on Facebook, of which it's a very small amount of the content, influenced the election in any way, I think is a pretty crazy idea. Voters make decisions based on their lived experience. One part of this that I think is important is we really believe in people and you don't generally go wrong when you trust that people

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understand what they care about and what's important to them, and you build systems that reflect that. Part of what I think is going on here is people are trying to understand the result of the election, but I do think that there is a certain profound lack of empathy in asserting that the only reason why someone could have voted the way they did is because they saw some fake news. I think that if you believe that, then I don't think you have internalized the message that Trump supporters are trying to send in this election.

**Kirkpatrick:** Which is what?

**Zuckerberg:** Let me finish on this for a second. The quickest way to, I think, refute the fact that this surely had no impact is why would you think that there would be fake news on one side but not on the other. We know, we study this, we know that it's a very small volume of anything. Hoaxes aren't new on Facebook, there have been hoaxes on the internet and there were hoaxes before. We do our best to make it that people can report that so that we can, as I said before, show people the most meaningful content that we can. I think the idea that that had any impact in the election is pretty out there.

**Kirkpatrick:** I actually don't disagree with you on that, although it's interesting, several of the tech journalists who happen to be here today specifically mention it as something that's of concern to them right now, so I think they'll be glad you commented on it. What about the idea of the filter bubble, which is a bigger concept that people talk about all the time. I am something of a Facebook expert as you know, and I'm often talking to people about Facebook and I can't tell you how often they want to talk about this idea, that they believe passionately that somehow it's distorting the way the world works.

**Zuckerberg:** Look, we've studied this a lot because, you can imagine, I really care about this. I want what we do to have a good impact on the world. I want people to have a diversity of information so this is why we study this stuff to make sure we're having that positive impact. For whatever reason, all the research that we have suggests that this isn't really a problem, and I can go into that in a second. For whatever reason, we've had a really hard time getting that out. Here's the historical analogy that I think is useful on this. If you go back 20 years and look at the media landscape, there were a few major TV networks. In any given local area there were a few major newspapers that each had an editorial opinion and those were your opinions that you basically, you got all your news filtered through that.

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**Kirkpatrick:** You received through that.

**Zuckerberg:** Regardless of what leaning you have on Facebook politically, or what your background is, all the research would show that almost everyone has some friends who are on the other side. So even if 90% of your friends, even if you're a Democrat and 90% of your friends are Democrat, you probably have 10% of your friends are Republicans.

**Kirkpatrick:** That's what your research has found?

**Zuckerberg:** Absolutely. Even if you live in some state or some country, you're going to know some people who live in another state or another city or another country.

**Kirkpatrick:** That's encouraging, because a lot of people I know say, "I don't know anyone who supports the other person." I happen to, so it's nice. I'm glad you said that, keep going.

**Zuckerberg:** I think they probably do. Whether that person will talk about it is a different situation. What we've found—you can go through everything, you can go through religion, you can go through ethnic background and all of these different things, and that kind of diversity is true. People tend to, even if in most cases, or a lot of cases, the majority of someone's friends might fit their beliefs; there are always some who don't. That means that the media diversity, and diversity of information, that you're getting through a social system like Facebook is going to be inherently more diverse than what you would have gotten from watching one of the three news stations and having that be your newspaper, or your TV station, 20 years ago. The research also shows something that is a little bit less inspiring, which is that we study not only people's exposure in Newsfeed to content from different points of view, but then what people click on and engage with. By far the biggest filter in the system is not that the content isn't there, [or] they don't have friends who support the other candidate or are of another religion, [it's that] you just don't click on it. You actually tune it out when you see it. You have your world view. You go through, and I think that we would all be surprised how many things that don't conform to our world view that we just tune out.

**Kirkpatrick:** They just floated down the feed.

**Zuckerberg:** Yes, we just don't click on them. I don't know what to do about that.

**Kirkpatrick:** That's interesting.

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**Zuckerberg:** I think we should work on that, I think presenting people the diversity of information I do think is an important problem in the world, and one that I hope we can make more progress on. But right now the problem isn't that the diverse information isn't there, actually by any study it is more there than in traditional media in the last generation, but we haven't gotten people to engage with it in higher proportions.

**Kirkpatrick:** That's interesting that, nonetheless, you'd still like to find tools to address that. I guess that leads to the next question, which is closely related. Since the Newsfeed is so important in democracy now. In almost every country in the world except North Korea, China, hardly any others, really, maybe Russia, [where] there's some other systems that are predominant. You're doing well even in Russia. When you think about the role of the Newsfeed in democracy, what special responsibility do you feel you have, because of its incredible importance?

**Zuckerberg:** The number one thing we do is give people a voice. That goes for every person and it goes for the candidates too, to be able to speak directly to the people that they're trying to lead. That is a profound thing, and in the US most of us have had the internet for a long time, and we have other tools. Having something like Facebook—again, most of what we do on a day-to-day basis isn't engage in political debates. We share photos of our children, we hang out with our friends, we get updates on our friend's lives. That's, I think, most of what, around the world, people would find most meaningful on Facebook. But in the US, if you wanted to engage in that kind of debate, if you wanted to get access to that kind of content, you would have had venues to have done that before Facebook. Facebook might help, it might make it so now you have an additional venue, now you have new ways to get access to more diverse news and follow more kinds of news.

But when you look at a country where the majority of people are just getting on the internet for the first time, where they have no tool like this, the delta is way more profound. People go from legitimately having very few tools to make their voice heard, to now having some very powerful ones, and that can have big effects on civic discourse and make society more open and be very positive. We're very proud of that impact but, I, again, I really believe in people. I think it would be hard to do what we do if I didn't, but I believe that people are smart and that people understand what is important to them, and can tell you what their problems are and what they think are going to be solutions to them and often don't need someone else to come do that. I believe that whether you're trying to build a company or run for office or whatever it is that you're trying to do: it's generally a good idea to bet on the intelligence of people. Even if an election doesn't go the way you want, I still think that giving more people a

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voice, over the long term, is going to lead towards a more open and better society where we're just more functional and we have the ability to make more progress.

**Kirkpatrick:** I happen to personally completely buy that you feel that way and I admire that, I think it is one of the key reasons that Facebook has grown so steadily for so long and will probably continue. You have to admit that you get into some weird situations. For example, this issue of whether Trump was committing hate speech under the terms of Facebook's terms of service. According to the Wall Street Journal, you personally had to intervene over your people who said, "This is a violation," in order to say, "No, this is the democratic process, at that level we can't interfere." But that's making an extremely important intervention in essential social discourse. Not that I think you were wrong, by the way, but it is an extraordinarily huge responsibility to have to make that kind of decision. And that's happening in Mark Zuckerberg's head, right?

**Zuckerberg:** There's a shift that is going on. We've spent a lot of time talking about Newsfeed and what Newsfeed shows and now what you're asking about is the community guidelines for what content is allowed on the service. When we started, the North Star for us was we're building a safe community. We're building a community where people feel comfortable being their real selves, and we're always going to be safe sharing those opinions. We're going to really fight against things like bullying and hate speech. One of the things that has shifted is that now, news is a more important part of what Facebook is. When we got started, there was no Newsfeed, there was no news on Facebook and now, people do share more news. We've had to weight newsworthiness as kind of a higher part of the community guidelines. We're still working through what that means, to be honest. We're getting a lot of feedback and a lot of criticism, and I think a lot of it is fair, from a lot of folks around the world who are saying that more, different things should be permitted. You're talking to someone whose mission is to give more people a voice, so that resonates with me when people say that. What we need to do is figure out how to square these two things: building a safe community, which I still think is the more important North Star and what people need. Again, most of what happens on Facebook is not political discourse, it's really people connecting with their friends and that is what is meaningful. But we do need to figure out how to be this place where people can get more of the content that's important news that's going on. I believe that people will tell us what we need to do here. The goal that we have with the community guidelines isn't to have our opinion be imposed; it is really to reflect what people want.

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**Kirkpatrick:** To take what you're saying concretely and literally: even the decision that you reportedly made about Trump would ultimately be something that software itself would be able to have instantiated within it—it's just you haven't gotten there yet.

**Zuckerberg:** A little bit, but what I'm more saying is that we set up these community guidelines and our real goal is to reflect what our community wants. That kind of content we would have thought that, previously, that would make a lot of people feel uncomfortable and people wouldn't want that. But at the point where, you know the person who's elected President of the United States is expressing that opinion and has 60 million people who are followers, then the question is: I think that is mainstream political discourse that I think we need to be pretty careful about saying that that's not a reasonable thing.

**Kirkpatrick:** I totally get that, and I want to end this section of the interview but I want to do it by asking this, which is really the macro question of this whole category, in my opinion. Facebook has acquired this extraordinary sociocultural weight, beyond any commercial enterprise in human history, in my opinion. Anyone in here disagree with that? [LAUGHTER] I mean honestly I think that's pretty well accepted.

**Audience:** The Catholic Church.

**Kirkpatrick:** But I said commercial enterprise. I didn't hear some of that but in any case it's extraordinarily influential. The question is, what are the checks and balances that need to exist for this new kind of entity, and do you think about that? At the moment, it seems like you are the check and balance. You are a very socially conscious human being, and I totally buy that. It's all over my book—anybody could read the book and know that. Now that Facebook has two billion, going to probably four billion users, you have a sort of social responsibility that no company has ever had before. I just want to hear one last thought about how you're going to navigate that.

**Zuckerberg:** Well, again, it's really listening to what people want. My goal, and what I care about, is giving people the power to share and giving every person a voice so we can make the world more open and connected. That's the mission. That requires building a good version of newsfeed that I think we're going to do the best work when we can incorporate how people value each piece of content in—and we still have work to do on that, on learning how people feel about all these different things and what people find valuable. We're going to keep working on that and keep improving it and you'll see more there. On the community guidelines, as norms change and as people

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want to see more news, I think we will have to continue to evolve the guidelines to reflect the values that the community holds. This is a really challenging thing.

**Kirkpatrick:** Especially when you're in 180 countries.

**Zuckerberg:** I was just going to say that, because the norms are not the same in every country. We don't have offices in every country. This is an area that I think we have evolved a lot over the last ten years; I think we will continue evolving. When we make changes it's not necessarily because something is so broken before, it's because this is part of the natural evolution of you're building a system, you improve it over time, that's what you do. Our job is to make it as good as it possibly can be.

This is a competitive space. There are certainly other companies that are trying to give people tools to share. Some are going well, some aren't. I don't think that this is a granted that if we fall off our game and don't serve people with what our community wants that we don't just continue growing. You look at how these different companies do—some are growing, some aren't. I think we need to keep on doing a good job. I think partially why we have had a lot of success is because we have been so attentive and listened to our community, which often includes feedback on both sides. People telling us that we're not open enough in some place and then often people say we're too open in that place, so we need to balance that. It's tough to make everyone happy, but we care. And we care about learning quickly and making this better and better and better. We need to do that to succeed as a company. We need to do that to succeed at the mission, which is ultimately what I care about a lot more.

**Kirkpatrick:** That's a good answer, but are you confident that that process is systematized beyond simply depending on you and Cheryl and Chris Cox and a few other really enlightened leaders?

**Zuckerberg:** Yeah, we're building the company every day, putting in new processes and new ways to research this and get different feedback. The world is pretty dynamic and things are changing pretty quickly.

**Kirkpatrick:** I don't want to beat a dead horse. But if the three of you—what if you were hit by a bus, right? I don't want that [LAUGHTER]

**Zuckerberg:** The proverbial bus.

**Kirkpatrick:** Given the quantity of data about individuals that resides inside Facebook—look at the pushback you're getting in Europe, for example, along with Google and other companies. They certainly aren't entirely reassured in many countries

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about this. My own opinion is you need to talk about these processes and the values more. And I think you're doing a great job today, but I do wonder about the systemization of protections, of a lot of factors that play into Facebook's social weight, essentially. I don't think you even have to answer that anymore.

**Zuckerberg:** It's an evolving system. It's not fully formed, and we'll keep on improving it, just like in your community: you keep on trying to improve it.

**Kirkpatrick:** But isn't it weird that it's not fully formed and it's so huge?

**Zuckerberg:** No! No, no. I mean, this is everything: nothing is finished.

**Kirkpatrick:** So let's go on to some other topics. I just wanted to ask you, one of the things Techonomy's all about, our little company, which we have our own faith in, is about bringing together leaders of all types for collective conversation about technology transforming the world. You spend more time and probably have more access to leaders of all types than probably many people that I can think of. When you do that, do you feel like that kind of dialogue is happening enough, about how important technology is to global transformation and social transformation?

**Zuckerberg:** When I go to different countries, I like to talk to entrepreneurs because they're more often the ones that are focusing on that. Oftentimes I'll go meet with the leader, but I personally get more satisfaction from meeting with the entrepreneurs on the ground who are actually building things. This, I think, is going back to your question about everyone's trying to figure out what the election result means this week. I think it's easy to underestimate how much of the progress is made, not by government, but by individuals and engineers and technologists and other folks who are private citizens, and companies, and NGOs who are building stuff and laying infrastructure and that infrastructure gets used by other companies to create exponentially accelerating progress. That will all continue.

One of the things that I think is really inspiring that I'm lucky that I get to do, is that I get to travel around a lot. We focus on connecting people all over the world. There's awesome stuff happening, all over, in every country. I just got back from my trip to Nigeria, and it's just super inspiring. You get off the plane and you feel people's passion, and it has this entrepreneurial attitude. We're going to get it done; we're going to go do this. A country like Nigeria, less than a quarter of the people are on the internet. Same in a country like India, less than a quarter of the people are on the internet. You think how many brilliant people are out there who, if we connected them, it's not just that they would have more opportunity, but we would all be better off

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because of the ideas and what they would produce. That's something that really drives me. It's kind of a crazy thing about the world that we're here, and less than half of people on the world are on the internet. That's not something that any one company can go solve by ourselves, but that that's something that I feel a responsibility to, as someone running a company whose mission is to connect everyone in the world. We are making an impact. Internet.org has connected forty million people to the internet, who weren't on the internet before. I don't think that there's ever been a connectivity program in the world that is more successful than that. I think a lot of people think about it as the initial free basics program that we rolled out, but it's not just that at this point. It's the solar powered airplanes that we built in two years that now can fly around for months at a time and beam down connectivity. It's express wifi, which is rolled out in Nigeria and across India. We call it an ISP in a box. We sell it to a local entrepreneur at cost to us, because we're not trying to make money on this, but then they can sell connectivity and access to their people in their community. That's much better than us going in and putting that box there, because we don't know where to put the box. But they do, it's their community. If they're making money from it then you can bet that they have an incentive to make sure that that box keeps working, and that people don't break it. And all these different things, that's how you connect people over time. That's what I care about when I go around the world, and I just think it's awfully inspiring to meet all these folks and how it's changing all these people's lives.

**Kirkpatrick:** It's been amazing, I've spent time with you meeting with entrepreneurs and engineers on occasion and your commitment to that is quite obvious, and it's impressive. Let's shift to the Chan Zuckerberg Initiative. That is something you haven't talked about too much in public, and you're putting more and more energy into to that. You recently committed \$3 billion to the project. You hope to cure all diseases by 2100.

**Zuckerberg:** End of this century. I think it's possible.

**Kirkpatrick:** You do

**Zuckerberg:** Yeah.

**Kirkpatrick:** Yeah, now so that's great. It's hard to imagine what that would even mean, but it's fantastic that you're going to put that much energy into it. Talk about the Chan Zuckerberg Initiative's basic goals and approach. We were talking about that a little bit before we came out. What's the way you think about how that whole thing is going to work, because you've said as part of that you're going to basically give away 99% of your worth.

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**Zuckerberg:** When Priscilla was pregnant with Max, our daughter, it was this great time to reflect on what kind of world we wanted her to grown up in. We always thought that we were going to give away all our money, and that we wanted to work on that, but there's nothing like having a child to make your realize that the future is soon, and that we want to do everything we can to make sure that she and everyone in her generation can have the best lives that they can. With the accelerating progress from technology and science, there's no reason to believe that people in the next generation shouldn't be able to have much better lives than anything we can have today. But, again, these are long term investments. It's not the kind of short term thing that we talked about in politics or even quarterly earnings at a company. These are things that you build infrastructure for five, ten, twenty years and you just make accelerating returns until it improves over time. The first areas that we're focusing on, the first one has been education and personalized learning. I think that there's a big revolution that's happening, giving teachers and students the tools to learn the content that they care about at the pace that fits them. Learning in a way that fits them, whether that's watching video, or playing a game, or reading or working with other students, or tutoring. Giving people the tools that they need there and, I actually think it would be cool to talk about that in a second because that's making incredible progress. I'm really optimistic about that for the future. I think most problems that society has, if you fast forward a generation, if you invest in education, that's probably the best way to address them long-term.

**Kirkpatrick:** And that's one of your top priorities.

**Zuckerberg:** That has been. That's been the first thing that we've focused on. And then, we just announced this early work, and a handful of leaders in a science initiative, with this goal to help scientists cure all diseases by the end of this century. And the reason why I think this is possible, if you look at the long arc of science, for thousands and thousands of years humans made no progress, or made very little progress, if you measured by life expectancy. Then, in the last 100 years, really more like the last 70 years, we have been much more rigorous. We started applying the scientific method to studying diseases. And since then, life expectancy has gone up by an average of a quarter of a year, every year. For the last 100 years.

**Kirkpatrick:** Wow.

**Zuckerberg:** Right? Life expectancy has gone up from about 50 to about 75, depending upon what country you are talking about. It's been linear—it's not like there was some jump and then it stopped, or there were diminishing returns. If we continue

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making progress there is a very good reason to believe that that will continue for the next 100 years and, but the time we get to the end of this century, it will be pretty normal for people to live well past 100, which of course implies that we will have had to resolve most of the diseases that people have today. Then when you look into it further, it turns out that most people die from only five categories of things. Then when you look into the history of science, what I think becomes really clear is that most big scientific breakthroughs are driven by new tools, new ways of seeing things. The microscope allowed us to see bacteria and cells and study cell biology, and make a lot of progress on that. The telescope allowed us to see the universe and really unlocked a lot of astronomy. DNA sequencing—this is all technology, technology gives people tools, tools allow us to observe things and make these breakthroughs. So what can we do? Sure, we can give money. In the grand scheme of things, governments have way more money than we do to give. If \$3 billion is a lot of money and I think we can make some progress there, but I actually think the big impact that we're going to have is not just that, it is building tools and doing engineering. In a way the strategy for the Chan-Zuckerberg Initiative is really to bring engineering to social change. We've found we can make a big impact through Facebook. Then there are things like Internet.org, where we're not just putting up wifi hotspots, we're building planes and building ISP in a box, or with express wifi, and building systems that integrate with carriers. The ability to do both philanthropy and build tools and do engineering is I think how you make the most progress. We found that with education, and I think that's going to be true with science, too. The Chan Zuckerberg Initiative is probably the only philanthropic organization in the world which is going to have a big, world-class engineering team. That's a big part of what we believe, and I think we bring something kind of unique to that, having built a good engineering team at Facebook.

**Kirkpatrick:** And you just hired a major person.

**Zuckerberg:** We just hired a CTO, Brian Pinkerton. He ran all of search and A9 at Amazon before. A long career there, a really impressive guy. And a handful of folks who I've known and worked with for a while have come over. We're building the engineering team at CZI to do a lot of this work in education and science. This is something that I'm really passionate about and can talk about for a while. Let me just tell one story on the education side that I think captures this really clearly.

When Priscilla and I were first starting to think about personalized learning, we looked at which are the schools that do this the best. One of the schools that have the best results is this network of charter schools called Summit Public Schools. It's founded by Diane Tavenner. It's based out here, and we went to visit them one day. One of the big

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things that they do—you walk in, and it almost feels like a startup. The students are at their desks and it's not a lecture, they're working together, in teams. They have computers, they have their plans for what they're trying to do, their personalized learning plans. They can go in whatever order they want, the teachers are coming around helping them. The results are great. One of the central parts of what they have is this personalized learning software. So I asked Diane, "You have great results and the software seems to be an important part of what you're doing, can I meet your engineering team." So she says, "Yeah, I'll introduce you to him." [LAUGHTER]. I said, "Are you serious, you have one dude building this?" and she said, "Yeah, I'm a teacher. I'm not an engineering manager, that's not my thing; I don't build an engineering team. If anything, I'm lucky that we have an engineer because there are all these other schools that could benefit from that but don't."

So we support them, through the Chan-Zuckerberg Initiative and we help them build more schools but, by far, the most important thing that we've done is build an engineering team for her. The agreement that we had was that we'll do this but the only thing that we have to agree on is that we're not just going to use this software for Summit Schools, we're going to make it so that any school that wants can use this software. And she said, "That's great. As a matter of fact a lot of schools come through, and they want to use what we're using but again, we just have one dude, so it's barely enough to even fix the issues that we have, we can't support anyone else." So now we've built a team, at Facebook, that has more than twenty engineers working on this. In the first year working on it we've rolled it out beyond the Summit schools to twenty more schools across the country, public schools, district schools, charter, private, in the last year. The second year, we rolled out to 100 more schools. This year, coming, we will roll it out to hundreds and hundreds of more schools. There are about 2,500 middle and high schools in the country. It is not inconceivable that, if you fast forward five years from now, that a very meaningful percent of schools and teachers in the country will have these tools to deliver personalized education to students that, again, through all the standardized testing, shows performs very well compared to a lot of traditional methods. So that is bringing engineering to social change. Giving money and doing philanthropy to fund this and to train the teachers and to build the model, and doing engineering to build this.

On the science side the opportunities are kind of endless as well. I probably talked to 100 different scientists before we started the science initiative. You hear similar stories. I remember I was talking to someone who was doing brain mapping. Understanding the brain is going to be one of the next huge frontiers for science. In the last fifteen to

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twenty years we started getting more of an understanding of our genomes, but we don't really have much of an understanding of how the brain works. Not just the diseases—neurological and neurodegenerative diseases—but we don't really understand how it works when it's working correctly. So that's going to be an important thing, but one of the first things we need to do is map it out. There are a lot of scientists who are working on this, and when you ask them to explain their work, a lot of it comes down to some manual things that are expensive for people to do, like taking a brain of a mouse or a fly and slicing it up so you can trace how the neurons go through it, so you can form a map of what the brain is. To someone who is a trained computer scientist like me, you listen to that, and your reaction is, "That is an engineering problem." Or at least that part of it is. So instead of taking five to ten years and doing this manually and having it cost hundreds of millions of dollars, let's build team of twenty engineers to do that in two years, so that we can accelerate the whole field. So I would ask these folks, why hasn't that happened? It's kind of the same thing. "The NIH grants don't support building a big engineering team. Every once in a while maybe I'll get a computer science post-doc who will come by my lab and he'll work for us, or she'll work for us, and then you'll hire them at Facebook" [LAUGHTER].

**Kirkpatrick:** I'm sure you hear that.

**Zuckerberg:** They'll work on ads targeting, or search, or something like that...

So I think that this is a big area where we can make a big difference in the world. And that's what we're going to do at the Chan Zuckerberg Initiative, is build up a big world-class engineering team that can work with scientists around the world, teachers around the world, to solve these problems and make progress. It's not just donating money to build a school, although that's really important too. This is infrastructure that people will build on, that will accrue, that will accelerate over time, and this is why I'm so optimistic that we're going to continue making progress. This is what I think we need to do.

**Kirkpatrick:** The optimism is quite palpable. That's what we call very 'Techonomic' by the way. Now we didn't get into the future of Facebook as much as I would like, and we're pretty much out of time but I really would like to take a few questions from the audience. Is that all right with you?

**Zuckerberg:** Yeah, go for it. Let's do it. [Laughter]

**Kirkpatrick:** Okay, let's take this right here. Identify yourself, please.

**Elahian:** Hi Mark, I'm Kamran Elahian and I'm very inspired by your talk.



**Zuckerberg:** Thank you.

**Elahian:** I highly appreciate what you talked about in your educational efforts when you visited Nigeria, particularly because about thirty countries across Africa, Middle East and Central Asia have been adversely affected, their economy, by the drop of price of oil. When you go to Nigeria or you go to any of the Middle Eastern countries, you will see the hunger that the youth have. Entrepreneurship and high tech is the answer that brings them hope. I was there a few months ago—10,000 entrepreneur and entrepreneur wannabes came to see me and get advice about how to create jobs. Lack of jobs is a cancer for any society. So, I just wanted to thank you for the great work you are doing, plus the internet work that you do.

**Zuckerberg:** I completely agree with what you're saying, I appreciate that. Building knowledge economies around the world, and modernizing these economies is one of the most important things that we can do. There's a big trend where, I don't know how many of you have heard of this term, "The Resource Curse." There are a lot of countries that, if you have oil, or if you have some natural resource, it creates the wrong incentives. Because having a resource is zero-sum. It makes it so the game in that country becomes "How do you control that resource?" But the thing about knowledge economies and connecting people and giving people the tools to do entrepreneurial endeavors themselves, and having an education system that doesn't just promote learning but also self-direction, and being able to explore the things that you want, and be more entrepreneurial—that just builds on itself. And that, I think, is one of the most important things that we need to do in the next generation, is enabling that to get built. Connectivity is one of the big things around that. When you look at the stats around it, there's a lot of research that shows that for every ten people who get connected to the internet, about one person gets lifted out of poverty and about one job gets created. It may seem not obvious. It may seem like if you're in a place where people lack jobs, or there isn't a good education system, or a good health system, that you'd want to do that stuff first. The reason connectivity is so important is that, if you live in a place where there isn't a good school, the internet is probably your best bet to get access to good information and learn about what's going on around the world. If you live in a place where there isn't a good doctor nearby, having access to the internet might be your best bet at getting access to the health information you need to help raise your family safely. I think as AI continues progressing, that will certainly continue to be true.

As an aside, I heard this inspiring thing recently where, at an AI conference, someone showed a tool that they built, where now you can just take a picture on a cell phone of

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a lesion on your skin, and instantly the system could detect whether it was skin cancer with the accuracy of the best doctors in the world. That's AI, and that's why I'm so confident it's going to save people's lives. In the future, you give people connectivity, they're going to get access to tools like that, and that's the next best thing to having a good doctor. In some places it might be better. This is, I think, going to be very important for building up the knowledge economy around the world. It's one of the reasons why I care so much about connecting people, even though a lot of folks...we have to do other things too. It's not the only thing but this is part of the critical enabling infrastructure for the world.

**Kirkpatrick:** Kamran is going to be on stage tomorrow morning talking about an amazing set of projects that he has that are related to this issue and it's quite impressive. I just want to know if I can take—I don't want to get in trouble up here—

**Zuckerberg:** You're going to.

**Kirkpatrick:** Can I take one more?

**Zuckerberg:** Yeah! Take a couple more.

**Kirkpatrick:** If I don't get in trouble with you, that's good, but I don't want to get in trouble with your people.

**Zuckerberg:** I don't think we can take all of these, but take two, you choose.

**Kirkpatrick:** Let's take this guy here who I don't know so I can't even guess what he would say.

**Webster:** Mark Webster. I would just love to hear more about your personal smart home and the lessons you learned on that project.

**Zuckerberg:** Every year I have a personal challenge, this year I decided to have two. I decided to build an AI to help control the home and, because I assumed that that would lead to me sitting around a lot more, I also have a challenge to run, on average, one mile a day. That one is actually done, that turned out to be easy and on to bigger things there. In terms of the AI, it's going well. The biggest thing that I've taken away from it is that most of my work has actually gone into integrating with the different systems in the home, because that stuff is all really fragmented. We talk about the smart home, and that being a big trend, but I think a lot of these things just need to get standardized. The music system, the lights, the temperature: all these different parts of things that go into your home, there's not a great API to do all that today, so

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it's taken maybe fifteen, twenty hours just to do all of that integration before you even get to doing anything interesting. Then, on top of that, one of the things that's been pretty fun about this project is, I don't get to write a lot of code in Facebook's code base anymore. We have a rule that if you make a change you have to support your change, so if it breaks you have to drop whatever you're doing to fix it. I feel like I'd kind of be a jerk if I made some other engineer go fix my change at Facebook, so I kind of gave up on coding within the Facebook system. But this has given me a reason to play around with all of the different AI tools that we've built internally. Things like face recognition, image recognition and speech recognition and I just think it's so impressive how much progress we've made on some of these things. It's not that they don't need to improve, or that I haven't needed to work to integrate that, but understanding the state of the art, how much these systems have made progress is really inspiring.

I believe that within five or ten years, we're going to have AI systems that are better than people at all of our main senses. That doesn't mean they're going to be intelligent, they're not going to have common sense or be able to go from one domain to being able to understand another. That is a big leap that we need to make that we haven't yet. But in terms of being able to see and kind of understand what we're seeing, computers will be better at that, AI will be better at that. In terms of hearing, and understanding language, and understanding the concepts and things, I think we're going to get to a world pretty soon where computers will be better at all of that. That is going to be really powerful in a lot of ways.

One of my favorite examples recently is we built this AI part of Facebook—we wanted to be able to look at an image and understand what's in it. One of the effects of that is now, for visually impaired people in our community, we can now speak to them what is in an image or in a video. That's really powerful. There are hundreds of millions of people around the world who are visually impaired. It's hard to use Facebook if you don't have something like that. AI, I think, is going to be really powerful for all those things and this experience, this year, of building this has only strengthened my belief about how good that is going to be. In terms of the home automation stuff, there's a bunch of work to do just basic home automation infrastructure.

**Kirkpatrick:** I don't think we should take any more questions. But I just have to say the world is lucky that someone with your optimism has your ability to execute. So thank you for that. I also think you do a really good job talking about what you're doing, and I hope you do it more because it's really good. Thank you so much for being here.

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**Zuckerberg:** Thank you.

[APPLAUSE]