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GLOBAL DEVELOPMENT IN A DIGITAL WORLD

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## P R O C E E D I N G S

MR. CHANDY: Good morning, everyone. My name is Laurence Chandy, I'm a fellow here in the Global Economy and Development program.

We are here today to talk about the impact of digital technologies on development. This follows the launch of the World Bank's World Development Bank, which I assume you all have read from front to back. It's only a few hundred pages long. It is actually a wonderful report. We have one of the co-editors of the report here, as well as an expert panel to discuss it.

When I was back at graduate school, I remember my professors telling me how important the World Bank reports were, and encouraged me to read them. When I think about the ones that left an impression on me, they include ones such as the 2004 WDR on service delivery, the 2011 WDR on conflict. I think what they have in common with this WDR is they provide a way for the reader to understand a complex issue in terms of what are the drivers, what is the impact, what are the risks, and so forth.

These are all quite complex issues which the development community has sort of struggled to deal with, struggled to talk about, and not just to speak past each other. I think this most recent WDR certainly meets that standard.

Deepak is going to provide a short presentation summarizing the report, but first I want to provide one short anecdote about the impact of digital technologies. A decade ago, I was living in Papua New Guinea. It is a wonderful country which has a pretty poor development record. I remember watching a documentary when I was there with footage of the highlands of Papua New Guinea in the 1970s, around the time of the country's independence.

Apart from the grainy footage, I watched this again, there was nothing about the video which told me it wasn't filmed today, a decade ago. People were wearing secondhand clothes which had been sent from western markets. Everything looked the same, the houses looked the same, the streets looked the same, the billboards looked the same.

I went back to Papua New Guinea four years ago, and the place had changed. Everyone had a cell phone, there was mobile money, other uses of cell phones.

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What I don't know is exactly what that means, how does that exactly change lives. I'm not entirely sure. For me, it was the first sense that something had fundamentally changed in a country where very little was changing at all.

I hope what we will uncover today is exactly how life might have changed in the highlands of Papua New Guinea and how it might change more with the impact of digital technologies.

With that, Deepak Mishra is going to come up on stage and provide a 15 to 20 minute presentation on the report, and then we will have a panel discussion. Deepak, please come up.

MR. MISHRA: Good morning, everybody. Thank you all, and especially Brookings for giving us the opportunity to discuss the World Development Report on digital dividends.

I will begin with a picture that you see on the TV screen, which captures the very essence of the World Development Report. How rapidly the digital revolution has spread around the world and to what extent people will go to be part of it. This photo, taken of the Coast of the Horn of Africa, shows migrants from Somalia crowding the night shows of Djibouti, and if you're wondering why are they holding their cell phone into the air, you would have to read the full WDR (Laughter) or you can listen to the presentation because there is a clue to it.

Mobile phones have spread more rapidly than any technology before. Nearly 7 out of 10 people among the poorest 20 percent of the world population now have a mobile phone. Nearly 40 percent of the world population are actually online.

This picture shows why. A typical day in the life of the Internet involves billions of e-mails, video's, searches, and so on. Behind those massive numbers lies a staggering amount of data and information, and some would even say knowledge, flowing across borders seamlessly and costlessly. The digital revolution has brought many immediate private benefits, easier communication, saving time, and new forms of leisure.

What about broader development gains? Faster growth, more jobs, better services, which collectively are digital dividends, similar in concept to peace dividends, demographic dividends.

The report analyzes the impact from the perspective of business, people, and government. The color coding that you see here is actually maintained throughout the report. The report

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mentions many technologies, from feature phones to smartphones, from computers to clouds, and from sensors to satellites, but this report is not about technology.

It is about the impact on development, and to see the transformational impact of technology, you have to listen to some of the stories and meet the people that we did while writing this report.

Meet Mr. Ming Hong We. Ming owns a ranch in Shandong Province in China. Ming gets live animals on a digital platform, and his annual revenue is close to \$50,000, which is a hefty increase from the \$200 monthly disability benefit he used to have before, and Ming proudly says I'm not a disabled man, I'm an online businessman.

There are 8 million online entrepreneurs, over 62 percent are small and medium entrepreneurs like Ming, women, and one percent are people with disabilities. This could not have been possible without digital technology.

A few years ago, a satellite passing over East Africa took pictures of many villages, including Kendu Bay near Lake Victoria. The satellite information was interpreted by freelancers working for Mechanical Turk. They studied the level of each house, the rate lights get reflected from the rooftop, which is a good predictor of poverty in Kenya because people are living in an attached house or thin house or a thin roof -- sent \$1,000 unconditional gas transfers to several beneficiaries via a mobile money platform called M-Pesa.

Later you will see on the picture a widow with eight children was one of the unexpected beneficiaries of this digital revolution. There were people like her, born into poverty in a remote village in a poor country. Hopefully, now a digital revolution.

The children in this picture were once a victim of human trafficking, condemned to a life of destitution. Like them, nearly a billion Indians have had a digital identification in the past 5 years. This is making it possible for the government to provide vital services to poor and vulnerable groups.

Countries from Nigeria to Pakistan and Estonia to Singapore are other examples of successful use of digital ID to improve service delivery and reduce fiscal waste, and this could not have been possible without the digital technologies.

Behind these compelling stories lies some pretty fascinating economics. The WDR proposes a simple framework for understanding how the Internet or digital technology broadly promotes development. By lowering the economic transaction costs and the social interaction costs, technologies are making three things happen, they are expanding the information base, lowering the information costs, and they are creating information goods.

By expanding the information base, they are reducing information friction across markets, they are lessening information -- buyers and sellers, and this is promoting expanding the market for business, for workers, and for government.

By lowering information and coordination costs through automation, technology is making existing businesses, workers, and government more productive. This is boosting efficiency. By creating information goods, the marginal costs falls essentially to zero, scaled economies, the new economy that we talk about, the platform economy, which spurs new business models and promotes innovation.

The report applies this framework in the first three chapters to provide many examples of how it benefits businesses, people, and government.

This is where normally I would stop. Everything I've said so far is what (Inaudible). Having established the benefits of digital technology, many have argued that it's only a matter of time before these benefits reach everyone and everywhere. Every entrepreneur can become Ming, every person can benefit like Supursa, and many of the poor and disadvantaged would have access and identity, just like the children on the street.

One would wish the story was that simple. Digital technology has become universal in many high and middle income countries, but the broader development gains have been elusive. Consider the following three things. The first one shows the growth of labor productivity, growth of labor productivity has been slowing down for the past three decades. The middle classes in many advanced economies have seen incomes stagnant over a long period of time, and that is the second curve, shows the people who are between the 65 percentile and 85 percentile of the world income, which is mostly the middle class, have really not seen their income and wages increase significantly.

Then we expected that the Democratic ideas and liberty would spread through the wires

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and modems and fiber optics, as was said in 1998, but what you see when you look at the last figure, the governance indicators like the share of free and fair elections falling for the last three decades.

What is really going on here? The report does not argue that this came because of digital technology, but wonders why they are happening in spite of them. Why has digital technology been spreading rapidly but the digital dividends have lagged behind?

We provide two broad explanations. The first one is the obvious one. Despite rapid technology expansion in many parts of the world economy, a significant digital divide exists across countries. Of the 7.4 billion people, 6 billion do not have broadband, 4 billion do not have access to the Internet, and 2 billion do not own a mobile phone, and about 0.4 billion people live outside any mobile signal.

Then within each country, there is a significant digital access gap, gender, income, age, and geographic. There is a large unfinished agenda to make Internet access universal and affordable.

What happens after access? Even if we solve the access problem, technology is not neutral in its impact. Among those who have access, the benefits tend to flow disproportionately to the better off, more educated, and better connected, and that's pretty normal, and that's what we sort of expect from basic principle economics, so in technical terms, digital technology has a productivity bias, so more productive firms use technology more intensively than less productive firms. Skills bias, most skilled people have more digital jobs.

That brings me to the second explanation in the story, the report argues that there are factors beyond technology that share the development impact, and we call them the "analog compliments" to digital development, and without those compliments, the benefits will often fall short.

When you have connectivity plus compliment, you get this wonderful innovation, but connectivity minus compliments just is leading to the goods market, polarized labor market, and more state control.

What are these compliments and what to do about that? Let's begin with the growth story and the business story. The sector itself is an important part of the economy, but it is relatively small, 4 to 5 percent of GDP and 1 to 2 percent of the labor force.

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Most of the growth in output and jobs will come from better adoption and not from higher production. This is not happening everywhere or at the speed at which we would like to see for three reasons, as listed in the diagram here.

To the extreme right, adoption of digital technology by non-ICD firms has been quite slow, and lastly, in the absence of competitive pressure in a business environment that continues to protect dominant firms and vested interests.

The one in the middle where the digital and analog forms are competing, there is uncertainty about how to regulate these sectors. Is Uber a taxi company or is it a software company? Is Mobile Money a banking sector product? These are the questions that policy makers everywhere are grappling with.

On the extreme right, the economics of the Internet favor monopolies and dominant firms in many parts of the digital economy, so far this has generally been good for consumers. Economic history has taught us that firms are sooner or later tempted to exploit their dominant market position, so it is pretty important for regulators to start thinking about how we create competition across platforms.

In summary, without good regulations, especially competition policies, that ensure a level playing field for firms to connect and compete, we may see much less innovation than expected. We may instead end up seeing greater concentration and monopolies and divergence between firms and economies and those that quickly come to dominate the market.

Let me turn to people and jobs. The Internet compliments allow workers to be more productive and to find more rewarding opportunities and higher wages. It is also changing the labor market pretty significantly and steadily. New forms of work tend to be more informal, and automation is destroying some jobs, including the mid-level white collar occupations.

As this picture shows, when you apply that in developing countries, you find that two-thirds of jobs in developing countries are susceptible to automation. In general, this is a good thing. Automation is how we get economic progress, but if you're one of those displaced workers it can be traumatizing and disruptive.

More important is what kind of jobs and what it actually means for the labor market. We

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have already seen polarization of the labor market in developing countries, but increasingly starting to see in the developing world. Middle skill occupations are increasingly automated, so that share is falling, and many of the people who were in the middle skills are likely to go to the lowest skilled jobs, so the low skilled share of occupations are increasing and the high skilled is increasing as well.

This is not all due to the Internet. Globalization also plays a role, but digital technologies are an important driver. The biggest risk from the digital revolution is not massive unemployment as some people tend to say, but widening inequality and polarization of the labor market.

The most important public policy response is to help everyone to gain the skills the technology complements, not those the technology displaces.

Let me move to the last slide of the presentation. There have been a large number of initiatives. It has given us easier access to information and more efficient government procedures. An extensive review of the evidence, and the report shows, that in many countries, this investment often failed to address the two most protracted challenges to improve service delivery, the relationship between the service providers, the policy makers, and citizens, which was the basis for the 2004 WDR, the whole principal agent program, and we don't see systematic evidence that the technologies will overcome that.

The second is the ability of citizens to participate in the so-called collective action problem. There are many interesting anecdotal stories but if you really look at it systematically, you do not see a dramatic impact of technology driving and overcoming the collective action problem.

The evidence compiled in the report suggests that initiatives that allow technology to improve service delivery often failed when policy makers and service providers are not accountable and therefore lack a strong incentive to improve services.

Let's see what we find here. What we do is we measure the extent of digital adoption by business, people, and government. That is a digital adoption. We measure the level of complements. Measure quality of regulations, skills, and institutions. Not very surprising, technology complements a rise in income but there are also considerable variations.

I just marked U.S. on the top, which is one of the countries that obviously has a very high level of technology adoption, as well as complements, but you do see there are massive variations. Many

low income countries have significant compliments, much lower technology adoption, and there are many countries that have a lot more technology adoption and much less compliments.

This data provides a simple diagnostic tool to prioritize policies of countries at different stages of development. One of the things to note is why we have one dot for each country, it could be possible that a country might actually have very different stages and different sectors of the economy.

Kenya, Mobile Money could be actually a transforming sector in Kenya because they actually have to start dealing with some of the programs that Mobile Money creates, whereas the digital adoption might be at the emerging stage.

Let me quickly move to policy. In the final three chapters of the report, we talk about what to do, where, and when. The implication is there are sector priorities. The second is national priorities where you talk about compliment factors in terms of regulations, skills, and institutions, and finally because the Internet crosses borders, we look at some of those issues you need to tackle to get the maximum digital dividends.

The ICD policies that ensure that everyone will get affordable Internet access is a pretty important goal, and we need to achieve that. This gets us back to the picture of the people holding up the mobile phones, the migrants in Somalia, who are streaming to catch a signal from the country they came from, which is Somalia, because telecom prices in Somalia is much cheaper than in Djibouti. As you see, they have seven operators, and Djibouti has a public sector monopoly. They are trying to see if they can catch a signal from Somalia so they can make a cheap call back home.

We have a fairly good idea, strong competition policy in the telecom sector, public/private partnerships, effective telecom and Internet market regulation. Sometimes there are strong social benefits from Internet access.

When it comes to the demand side policies or the second generation policies, frankly we don't have a really good idea of a solution to this, but we do talk about the problems. We provide a lot of information to have a more vigorous debate about how you deal with these, privacy, cyber security, and censorship. This picture illustrates how the world view on privacy has changed in the last 10 years.

Let's talk about national priorities. There are many practical steps that countries can take

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to strengthen the analog compliments. How to adapt regulations, skills, and institutions to digital at the different stages of digital development.

The Internet usage still fell low. The priority should be to build a foundation for making adoption easier. If you're in a transitioning context, that's where we need to ensure that everyone is able to take advantage of new technology, and if you are in the transforming context, where the Internet users are already very high, the need is to address the problems the Internet itself creates, such as complex competition.

In a sense, what we are saying is the first one is adoption, the second is absorption, and third is mitigation.

The final chapters go to global issues, how to govern the global Internet and how to remove barriers to the digital market. One important aspect is how institutions, such as World Bank, and perhaps to some extent Brookings, can better leverage the technologies to improve their own functioning and become more efficient in doing what they are doing.

We hope the report, and you will see a lot of discussion, will start a more widened debate about this topic with our development partners.

Let me conclude saying what is the big message in the report. I think I've said enough, but we are saying connectivity is important but connectivity plus compliment is what gives you the digital dividend.

One of the important messages is a digital development strategy needs to be much broader than ICD strategies. Connectivity for all remains a hugely important goal and a tremendous challenge. We need to do more.

Let me go back to the three examples I started with. Safaricom was able to roll out Mobile Money because of rapid spread of cell phones in Kenya, but also because the regulators, especially the Central Bank, allowed it to compete directly with banks. Ali Baba's success was based on wide ranging internet coverage , but equally due to many successful engineers. Mr. Ming, that I showed in the picture, was actually an engineer before he became disabled, and he had many of the skills that you need to be successful in a digital economy.

Aided by the support of the business environment, including good logistics. India's digitalized system relies on a large database and fast communication, but it cannot -- service delivery to poor without accountable policy makers and service providers at all levels of government.

You might say after all this long discussion, so you're telling me the same old story, regulations, skills, and institutions is going to deliver digital dividends, so what is new about this?

I think there are two big things that are new. The first is the technologies are going to amplify the returns for traditional reforms. Technology is now going to increase Internet education because it amplifies the ability of the workers to do more. In a sense, the failure to reform means falling further behind, so the risk/reward in the development business has dramatically shifted because of technology.

The second is while technology is not a shock to development, now we can use technology to improve our competitiveness and to improve our institutions, so in a sense, we think technology is not going to shock in the sense that you do need those things and technology alone will take you there, but what technology can do is help you to form those compliments much faster which will give you the final dividend.

What the report proposes is that when these compliments of digital investment are absent, the development impact of new technology will often be disappointing, but when technology builds a strong foundation, there will be ample digital dividends, faster growth, more jobs, and better services.

Thank you very much for your attention. (Applause)

MR. CHANDY: Thank you for your patience, everyone. Deepak, that was wonderful. I want to ask you a question, but before I do, I am going to quickly tell you what an outstanding panel we have here. I think you have the bios. I'm not going to read them.

We have Susan Lund from McKinsey. I think you probably all know that the McKinsey Global Institute does really some of the best work on understanding the impact of the digital economy. She also has done some work in Africa.

We have Jonathan Donner, who is Senior Director at Caribou, which is a little outfit based

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out of London. Pioneering research on digital opportunities for developing countries.

We have Christina Sass, who is the Co-Founder of Andela. I'm not going to tell you too much about Andela. You may already know. I want Christina to describe it to you in a minute.

It is a great panel, and I'm going to delay their chance to speak while I ask Deepak one quick question. I warned Deepak beforehand I was going to at least have one go at the framework in the report, and we will see how you handle my question.

I read the overview many times. I've read other parts of the report. I really enjoyed the presentation. It leaves me a little bit depressed. The reason it leaves me depressed is as I look at that slide, looking at the correlation between the strength of the analog compliments and extensive adoption of digital technologies, and I see the U.S. up at the top.

When I followed the domestic discussions here about the drop off in productivity and the concerns about employment, I hear these are the same kinds of concerns where we are not getting digital dividends, we are not getting sufficient dividend dividends.

When I think back to the WDR of 2011 on conflict, it said developing countries, it can take 100 years to build those analog compliments, to build those institutions. Even if developing countries in 100 years end up with a quality of institutions, let's say the U.S., they are going to end up with the same kind of disappointment the U.S. has today. Is that right?

MR. MISHRA: No, I don't think so. (Laughter) The first thing is some of the disappointment comes from the fact that you believe technology is going to solve the problem, and we are saying of course, there is a lot of hype on this, and some of this is true.

We see transformation effects of technology in China, India, and Kenya, and all over the world. Every country you go to has inspiring stories about how in the most fragile situation, technology -- the question is these are anecdotes.

What you want is a flow of systematic evidence this is actually happening all over the place, and it's going to take time. To me, the problem in developing countries and the developed countries are slightly different in the same context, but on average, I think the developing countries have very little to lose in the next 10 to 15 years because the more technology -- I think in many cases, they

have the right compliments, a fairly large percent of the firms, people, and government have the right compliments, so they should be able to get more dividends.

When it comes to richer countries, for them to continue to receive a gain, they have to deal with the problems the technology creates.

Kenya and the U.S. are very different, India and the U.S. are very different, and each has to struggle to solve a problem. I don't think that would necessarily mean -- nobody has said that because of the fact that the people in the U.S. are saying oh, what has the technology brought us, I don't want to go there.

By the time we reach a \$40,000 per capita income, we will find a way to solve that problem.

MR. CHANDY: Okay. I tried. Susan, you have done some really interesting work at the Institute on what you describe as "digital flows." Normally, when we think of globalization, we think of flows of trade, capital, of people. You came up with this new category of digital flows. You look at how countries do in terms of how competitive they are, how engaged they are in digital flows.

Can you explain a little bit about what digital flows are, and how developing countries perform in terms of engagement, but also are there constraints to engaging the digital flows with what Deepak described, or are there other things we should be concerned about?

MS. LUND: Well, first of all let me compliment Deepak and his team on a wonderful report. It is truly very thoughtful. It's a rich document that's going to be useful for many people for many years to come.

One thing that we look at is cross border data flows. We've looked at globalization now for several years, and one of the things you see very clearly in the data is that the last era of globalization seems to be over.

When you look at global trade in goods, they fell sharply in 2009, had some rebound in 2010, and have been essentially flat and even growing more slowly than global GDP, as slow as that is, since 2010.

We look at what's driving this, same with financial flows, down very sharply, not likely to

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regain their 2007 peak due to a sharp drop off in intra-bank type of flows for many, many years.

This is what many pundits say well, globalization is stalled, it's over, we have protectionists, sentiment given, slow economic growth in all the advanced economies, and now many emerging economies, and China as well, so this means the great phase of globalization we saw is over.

We think of it very differently. We believe actually we're entering a new phase that we call "digital globalization." It's true there are both cyclical and structural reasons that global trade has flattened in growth and may in fact never regain the robust growth that we saw for the last 20-25 years, but what is exploding is cross border flows of information.

This has taken the digital dividends that Deepak was talking about within an economy and thinking about the cross border connections. In general, emerging economies have far lower cross border data flows. In Africa, for instance, the submarine cable that circles the continent is a relatively new phenomenon. Broadband infrastructure has a long way to go inland from there.

What it opens up is new possibilities. Now, if you are say a young person in Kenya and you know some computer coding, you can go on a platform like Freelancer.com and be working for a European or U.S. company doing freelance work without ever leaving home.

If you are a start-up in Lagos, you can get funding from Kickstarter.com. We profiled a South African med tech company that has a new app for diabetes management that got funding from abroad, mentors from abroad, and now sells to a global market.

What it is doing is opening up the possibility for people in low income countries to participate directly and immediately in opportunities to work, to learn, to showcase their talent.

We have a report on all of this coming out, as it happens, tomorrow. Feel free to visit our website and download it.

MR. CHANDY: If we want to see developing countries being even more successful in engaging in these cross border flows, is it analog foundations and is it also the infrastructure we're talking about?

MS. LUND: I'm an economist by training. I would never say that all countries don't need more competition, skills, accountability, transparency, and governance. These things are clearly critical.

Digital technologies are not a silver bullet for emerging economies to move up the income ladder. That said, what's amazing to me is how despite all the barriers to doing business and despite the lack of skills, how when you do provide Internet access or mobile access to people in emerging markets, there are those entrepreneurs that jump in despite all odds and set up, for instance, in Legos, you can have food delivery service.

The first barrier of that company was to say, well, we don't know where people live, there is no White Page directory, so when somebody orders, how do we know where they live. Well, because of GPS on their phone, they know. There are now start-up's in Lagos that probably have a more complete directory of people's names and addresses than the government itself.

I'm a full believer in analog compliments, but I would never say wait for those. Maybe one quick last note on your question, why don't we see the digital benefits. Where are the digital dividends in the U.S.

One part of the answer is we're measuring the wrong thing. When you think about the digital Internet in the U.S., a lot of the benefit so far has been in unpriced consumer surplus. We think we don't capture that in the way we measure GDP.

Most of you have a smartphone in your pocket. Your Smartphone that you spent a couple of hundred bucks on replaces, at least for me, a camera. It replaces many books and magazines and physical copies that I bought. It replaces boom box or mobile music systems, it replaces a GPS system that we used to put on the dashboard of our car, all those purchases I no longer make because I spent a couple of hundred bucks on a Smartphone.

The way we measure GDP -- that just went down -- my welfare as a person went way up.

MR. CHANDY: That's presumably true maybe to a lesser extent in the developing world, too; right?

MS. LUND: Absolutely.

MR. CHANDY: Jonathan, one of the early slides from Deepak when he turned from the optimistic to the pessimistic, the transition in the slides, Deepak talked about all the people who don't have a cell phone, who aren't using the Internet.

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One of the numbers, which I found really striking in the WDR, says something like 40 percent of the world, the developing world, 40 percent of the entire world are using the Internet. Ten percent of the world don't access the Internet. That leaves half the world who have access, or have the potential to be using the Internet, and they are just not.

What's going on? What are those 3.5 billion people doing? What's making them decide not to use the Internet?

MR. DONNER: Thanks for having me, great to participate in this, and it's a fantastic report, generating all sorts of new ideas for me, and I'm grateful to have a chance to engage with your guys on it.

In that middle kind of band between everybody has probably more than one device per person out there, always on broadband connections at home. It's never going to stop. We have no problem at all with it. To the extreme, there are hundreds of millions of people who don't live under a cell signal, and we have profound entrenched challenges ahead of us in getting access to those people.

In the middle, there are these Internet behaviors, these Internet practices, Internet sort of digital days, that don't look like our digital days very much. That is one thing to have to understand.

Even if you have a cell phone, even if you have a Smartphone, if all you have is a 3G connection, and you pay by the bit, your Internet is not our Internet. The slide you showed, the beautiful picture of the images of everybody holding up their cell phones, it is a price signal. They are reacting to sort of an artificial signal that prices are higher here. That is because people are incredibly price sensitive.

When every bit counts, the decision on the margin about whether to consume or not, whether to click or not, whether to leave your little Web M.D. app running to monitor your heart, make you healthy or not, maybe not. That's the challenge we need to get to and we need to resolve.

It's going to start to show the strains of the promise, I think, that we have all been embracing around mobile. Mobile has been great to get some sort of Internet out or at least some sort of possible Internet out to almost everybody who lives under a cell phone tower. Mobile is not going to be the solution as we see it now.

Mobile as we experience it now is not going to be the thing that allows everybody to participate in the same Internet that we participate in, and I would even say that's the oDesk workers and everything like that. If you have to pay for the bit, how much are you going to do?

There is a lot of work to be done there. People may just decide not to go online because there is nothing there for them, but I think the social media companies are doing a pretty good job finding something for almost everybody.

MR. CHANDY: You think the price is especially important?

MR. DONNER: I do.

MR. CHANDY: One of the things I've heard is this issue of local content. In a lot of places in the world, if you speak that language, there is nothing for you there. Is that kind of a real minority issue? There is the price and just the whole content quality concern.

MR. DONNER: I'm going to make two adjustments on each of those. On price, it's not just the absolute price measured as kind of a proportion of your household income, but actually how it's billed. The experience at every single moment of living in a prepaid mindset changes how one interacts with the Internet. I don't think we give that enough credit when we talk about a more mobile Internet.

MS. CHANDY: We haven't been very good about not plugging stuff. I want to say one thing. In a recent report that Caribou did, which tried to illustrate digital days, of young Kenyans, with very modest daily incomes, and what devices they are using, what connections they are using, and what they are doing with their digital data, which is really fascinating work. Do you want to comment on that report?

MR. DONNER: I must. Thank you very much. I think the way to tie that back to your question is what constitutes the most of the digital day, for better, for worse, it begins with an "f," and it's Facebook. In places where Facebook isn't the number one social network, it is in China, whatever networks are in China.

Social networking delivers all that local content which seems so hard to generate through centralized means, right. As long as the language system support other people interacting with each other, as long as people have the language skills to participate in the Web, lesser every day but still requires text, then I'm not as worried about the local content drop.

I'm worried about getting people's primary Internet connection sufficiently affordable that they perceive they can use it. Mostly, that is mobile, but that is also through Wi-Fi, computer centers, satellites, drones and such.

MR. CHANDY: Christina, you have been really patient. You are providing people in Nigeria, I think, and was it in South Africa and some other countries, a chance to do much more than just access Facebook by harnessing the digital opportunities. Can you just briefly describe what Andela does because it is probably the coolest idea I've heard, how you can use digital technology for development.

MS. SASS: Thank you. Andela is seeking out the top tech talent in Africa. We're looking for passion and drive. We're screening thousands and thousands of applicants, mostly because we pay people to train and re-train in the most needed digital technologies on the global marketplace. That is based on the technical side and also soft skills, we are building into technologists that it is a full pledged career, not just in the nuts and bolts technologies.

We are screening for talent and drive, and then we re-train hoping to level up in the most needed technologies and then we place them full time as full time workers in companies all over the world. We have clients in the U.S., on the West Coast and the East Coast. We have clients in London. We have clients in Lagos and about to have clients in Kenya as well.

They are not outsourced workers. They are incredible problem solvers, and it is a new model for integrated workforces. It's recognizing talent wherever it is and re-valuing that talent wherever it is.

MR. CHANDY: This seems to address lots of different problems. It seems to address the skills shortage, job matching concerns, trying to create a more level global playing field. There is the need for new skills in sort of the new economy.

You're a pioneer in this. This is still fairly early days. What does this look like, not when Andela is at full scale, but when you have lots of people copycatting what you're doing or building similar things, how far does this go, these sorts of approaches in terms of solving what are fundamentally big failures, right, of education institutions, of the job market and so forth?

MS. SASS: Well, I'll start with the bottom line. In terms of global employment, we believe

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that if young people are going to put their time and effort into a four year commitment, especially one they paid for, that did not end in a career path, they should get their money back. We want to flip that model on its head and say if you're extraordinary and you're willing to dive in and give it your all, then something should absolutely prepare you for a market, a job for you.

How far can this go? I know we're going to get into all of this. It's extraordinarily difficult to provide this in Lagos and Nairobi right now, mostly because of the costs of broadband access, and the level of training needed to really compete on the global marketplace.

The technical skills and amplitude is really just the beginning. I can tell you stories all day of people trading in their lunch money for access to be able to train on the tech staff they think is best, but anyone who has ever worked with software developers, they are no different in Lagos than anywhere else, where they need soft skills, and they need the business skills to be able to really work cross culturally as much as anyone else. Remove the big headphones and learn to actually solve a problem with a team that's on a deadline.

If we can address those, if we can address those pieces, then we believe the capacity for growth is massive, and we would encourage copycats.

Right now, we are in Lagos and in Kenya. We have just about 160 people in Lagos and 40 in Kenya, and then adding about eight every month. We're going to build slowly in maybe the next year, and then hope to expand potentially to Uganda and South Africa, into regional hubs that recruit from all over.

The long term goal for our technologists is to be able to compete, to be able to be the lead technologists in their field, and employ them once they graduate. We are a four year program. We want them to graduate into governance, into CTO, leading engineer roles, and also to help us build this model, and then build their own companies, right, to be entrepreneurs.

The goal is for them to help to make growth equitable across the continent, and without cutting edge leading technologists that are Africa, we won't do that. We would love and encourage more people to be doing this.

MR. CHANDY: That's great to hear from our tech pioneer. Susan, I want to bring you in

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here again. I know you've done some work looking at both what you perceive to be the efficiency gains in terms of job matching through digital job platforms, and also the demand for skills in the future, that there is a mismatch between the kind of jobs there are going to be needed and the kind of skills we currently have.

Could you relate that to this Andela model?

MS. LUND: I'm fascinated by Andela. I'm so glad that you exist. I hope many people copycat you. There is tremendous opportunity for emerging markets, for talented individuals within low income countries, I think, to leap frog ahead and tap directly into the global marketplace.

You do need the skills. Now, the digital platforms exist. Without being part of Andela, you can actually if you have skills go on to many different global platforms, Freelancer.com, what used to be oDesk is now called Upwork.com.

There are a growing number of places where largely people in low income countries are finding work from companies in high income countries. One of the interesting things is that flow is now starting to reverse. You have large Chinese or India companies hiring freelancers in the U.S. and in Europe for different sale and marketing, more localized content.

You see these flows of labor crisscrossing the world. That way, we think digital platforms are part of an answer. Maybe to Deepak's point, this isn't going to lift every poor person out of poverty. This is about giving people with talent with a reasonable primary and secondary education an opportunity to find employment that they are not finding locally, and they are finding they can earn more money and have better incomes.

At the same time, there is an opportunity even within emerging markets to really open up some of the inefficiencies and lack of transparency in labor markets. Traditionally, somebody goes to an employer, you signal your quality with maybe where you went to school, the degree you earned, maybe your grades, maybe you have a personal connection with someone at the company, but it's a very, very crude signal of what you can do.

Now, with either online job boards or sites like LinkedIn, you can post incredible detail about what you are able to do. You can post books you have written, reports. You can get

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endorsements from colleagues who talk about not only your hard skills but your soft skills.

For employers, this means you can do a much better job of seeing what this person has to offer, and hiring to meet your own needs.

There is now a whole slew of companies that are actually doing away with this sort of resume approach, and they are doing it directly by scraping information about all of you from around the Web, what you are doing on social media, your employment history, your education history, and putting together profiles and then actively going after a certain person.

MR. CHANDY: Christina?

MS. SASS: I would not discount that a lot of people are finding that kind of work on Freelancer and Upwork, but what we are finding is that it doesn't level people up. We talk about dividends. We talk about catapulting people's abilities, and for these emerging economies to build the robust tools that are really needed to roll things out, we don't see that happening on those platforms.

I'll give you an example. You talked about the food delivery service in Lagos. A lot of the major like rapidly growing technology companies in Lagos outsource their software developers. That's tragic. That talent is extraordinary. When I say "extraordinary," I mean we've had 27,500 applicants. Christina Sass would not make it as an applicant. They are crazy smart.

The education system there aren't training, and the companies that are there, I don't blame them, they should not stop their growth because the technology isn't there, but somebody has got to get in there and really fill that gap to be able to level people up to grow the dividends that we want.

MR. CHANDY: Jonathan?

MR. DONNER: I think one thing that is interesting is not all flows are -- they are not all the same, and your position relative to the flows, to use sociological perspectives on it, helps determine whether these flows work for you or against you.

This idea of being able to work for somebody who really is willing to pay you who is 5,000 miles away is an example of the flow working for you. If you're a taxi driver in Nairobi, and now Uber is reconfiguring that industry, and that's a flow.

I don't know where the Uber server sits that actually determines the ride for something in

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Kenya, but I know that 30 percent of that fee goes to Silicon Valley, right. That's a strange thing to have happened to something that was a local market that was a geographically defined regional service done by people for a long time.

Food delivery, you have Tea Walla or something at the corner shop somewhere in any one of 1,000 towns in India, Yelp! and Google Maps and everybody else, knows where that Tea Walla is, and whether the tea is good or not, even if the Tea Walla person themselves doesn't know that data exists about them, and that is a big challenge.

The challenge is getting everybody skilled up to be able to participate in whatever structures or whatever flows are hitting them, and it's a big problem.

MS. LUND: Two points. One is, look, it is a global marketplace. It is tragic that start-ups and others are going to uplift to higher computer programmers probably in Bangladesh or India. It is suddenly a global marketplace, which I think underscores one of Deepak's points, which is there is a risk of countries and individuals getting left further behind if they can't compete in this new world.

I think to the second point, this issue about the price of all of this, and can you afford to actually participate in the global opportunities because you're paying so much for bits and data, you can't afford to either work or take courses or avail yourself of the information. I think that is critical.

MR. CHANDY: Deepak, I know you want to say something. I want to tackle one more question. (Laughter) One of the things I heard from Jonathan and Christina is that the infrastructure is still pretty weak, pretty poor in a lot of developing countries.

This is a public goods issue, and one of the purposes of foreign assistance and global philanthropy is to try to fill in some of those public goods.

Is the World Bank going to start devoting serious money or is it already devoting serious money to the capital goods, the other investments needed to provide the kind of infrastructure we want. If it isn't going to be the World Bank, who should be doing this? At the moment, I think we are all kind of waiting for Mark Zuckerberg to pay for this, which is lovely, but it doesn't seem right. He might not.

Who should be providing these public goods where the developing country governments tend to un-provide those goods or provide them with poor quality? Another easy question.

MR. MISHRA: I think the only place where we can say the world is waiting for Mark Zuckerberg to come in, I don't think anybody in Kenya, India, and China are waiting for Facebook to provide infrastructure they lack.

We can get into this with the World Bank, what World Bank is doing. The World Bank has been doing it for 60 years, but I think the whole idea is how do you do it better, how do you improve it.

We have this one chapter saying we didn't want to talk too much because how could we be telling what the World Bank should be doing, but we still do a little bit of it. It is Chapter 6, Section 2, which is about 10 pages, and is World Bank going to wake up to that and do things.

We can still be there for roads, schools, and hospitals, and there is a lot of discussion in the bank on this.

MR. CHANDY: ICT infrastructure, too?

MR. MISTRA: Yes, absolutely. Strangely, in the bank, we have little demand for connectivity projects. As long as the fibers are connected, the first mile has been solved. Now it is the middle mile and the last mile.

I would just say one or two things. One is the thing that Christina's shop is doing is exactly what we are saying, but if you listen to people, they basically say you bring broadband to a village and it will solve the gender problem, employment, and by doing it, not that it's not true, it's actually delivering a service to the developing businesses because the politicians would say so why do I need to do anything.

If you don't look behind, just because a deeper flow becomes so dramatic and the cost of data is zero, of information is zero, you are consuming a lot of it, but is it leading to jobs' growth and service delivery.

Sixty-seven percent of e-mails are junk in the world, 2.7 billion, 67 percent are junk. Forty percent of digital flows are pornographic in nature. Clearly, just because we have lots of data flow, look more deeper to see what are these things doing. I think those data flows are important, as mentioned, the freelancers, super important.

We have to look at which are the ones we want to encourage.

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MR. CHANDY: I think we can all agree pornography and junk mail -- Netflix, I would defend. (Laughter) I want to go to the audience. The rules are it would be great if you can identify yourself, if you have an affiliation, you want to tell us that, that would be interesting to know. Have a question if possible, and a relatively short one if possible, that would be great. I will take them in groups.

Please raise your hand if you have questions. I have one, two, three. Start with the lady in the gray cardigan. Thank you.

MS. PAYNE: Thank you. I'm Judy Payne from USAID. I'm an ICT advisor for agriculture. I'd say that in agriculture, the agriculture sector is extremely important in the developing world, 80 percent of the poor in Sub-Saharan Africa are farmers. Affordable access is a huge challenge and one that is being addressed by the World Bank and others.

Do you have any other comments or insights on progress we could make in agriculture?

MR. CHANDY: Great question.

QUESTIONER: Hi. First, congratulations on the report. Because of the fact that at World Bank, it has been a very difficult process to get any research in this area, so this is in some way a breakthrough to have it in a WDR, recognizing this is an important part of the development process.

The main concern I have really is related to implementing or operationalizing the recommendations of the report. Here, I think there are major challenges. On the one hand, I don't think the access per se is the biggest problem because I think a lot of that is being done by the private sector or through public/private partnerships. The World Bank has been doing a lot of that in the past anyway.

Many of the issues related to privatization, participation and so on, in some way have been addressed or at least standardized. We know the prescriptions for that.

Also, the compliment, to some extent, I would say is the bread and butter of most of the agencies, especially in the World Bank, and there is really no controversy about the fundamentals there. It is being practiced by most of the projects.

However, there is a major gap, and I think the gap is also in the report, but is going to be a big challenge for implementation. That is the fact that organizations, especially government and small and medium enterprises, face a major problem of learning to use information technology, not in terms of

mobile, but systems, integration, doing business. These are capabilities that need to be developed over time.

A paradigm shift like this, there is a lot of adjustment needed for business processes, for skills, for not just individual skills but organizational learning and so on.

Somehow I feel the report does not bring that across enough, which is a major, major issue in my view. It is a major issue for development agencies.

MR. CHANDY: That is a very good point. Finally, did you have a question?

QUESTIONER: Hi. Thank you very much for speaking. My name is (Inaudible). I'm a student at American University. My question is we think of China as having a big impact on the digital world, how exactly do you see China changing the digital development if anything, developing digitally in the near future and for far future as well? Thank you.

MR. CHANDY: Deepak, some of these are for you, especially the second question. I also think the second question about kind of the capabilities, I'd love to hear Christina's take on that. Why don't I go to you first?

MR. MISHRA: Is it possible to put some of the back-up slides up? No? Okay.

The first thing I wanted to say, this was a 15 to 20 minute presentation, so there is a lot in the report. We have six section focused notes on agriculture, energy, health, urbanization, education, and disaster-riskmanagement. I would really urge you to take a look at this. Just Google WDR2016. We also have what we call five digital enablers, digital payment systems, social media, digital ID and digital big and open data

These are more specifically getting into what we are doing in agriculture, and it was actually put together by the agricultural practice, which is very interesting.

We say technology is allowing us to get into newer areas, bring in new farmers, getting the new kind of cultivation using digital technology. Where we can farmers be much more productive, getting them to markets, provide them with the fertilizer at the right time, and then the whole digital innovation platform area, how to use the data, and also innovation that is happening to kind of improve productivity.

The second question was --

MR. CHANDY: Capabilities to use the digital technology.

MR. MISHRA: One of the things that I find somewhat upsetting, we are so focused on how much people have access to it. We have done some data about how many individuals are on the Internet, how many have mobile phones. Nobody has good data on how many firms in developing countries have access to the Internet, how many are doing business online. Very little.

One of the things we were really focused on saying, a lot of the benefits of the digital technology -- only 15 percent of the firms are using Cloud, we talk about Cloud -- in terms of using it to pay and do their business, there is very little, 10 percent of the firms are actually doing online business. That leads to the question with China. China has what are called Taino Villages. These are villages where 10 percent of people are selling online. Once you have a village with 10 percent starting to sell online, you are declared as a Taino Village. There are Taino universities which are helping entrepreneurs to say how do you do -- these are all the analog foundations created.

I think the countries which are able to bring the technology as well as provide that kind of support, it is amazing how much -- one of the things we find is if you go to India, the largest educational institution in India is not an university, it is the third largest or largest company, because they are finding a lot of kids who come out of colleges do not have the kind of skills, so people are coming in and getting educated. If you go to China, there is a huge place for getting all these vocational skills.

I think unless we start to track how much is online, just have basic statistics, look at our business people in government, we find in Africa, the businesses are really behind. Eighty percent of people are online, and governments have invested massively in many of these countries.

Clearly, the focus has been completely upside down. I would say the biggest focus in many of the low income countries has to be how should they get the businesses online, to have more solutions. How do you get more competition so that firms will always look for new ways to be competitive.

MR. CHANDY: On this issue of firm capabilities, and I think one of the most compelling explanations I've seen is the drop off in productivity in the U.S., the variance in the adoption of technology among firms. I'd love to hear your view, Susan, on China. Before I do, if I could quickly go to Christina

just to ask about the kind of skills which your Silicon Valley partners are looking for.

I remember hearing you speak last summer where you described people who are graduating from universities in Nigeria in computer programming and they have never spent a day doing coding.

I'd like to hear a bit more about exactly what kind of skills are being demanded by the investing firms, if you could expand on that, that would be fascinating.

MS. SASS: Sure. Yes, we do see a lot of extraordinary young people that have gone through a four year degree program that maybe they had JavaScript, maybe who have learned most of their computer science program from books and really not have -- we have to get the tools, the right tools out there.

When you talk about implementing and the barriers to access, we are making great strides, but it is extraordinarily resource intensive and labor intensive to provide a real work environment where people can reap digital dividends.

Just to put some numbers around that, in Lagos, we pay just under \$10,000 a month, and we are right on the fiber cable, so that is not off the grid, in some place where it is less expensive to operate, we are right where the government did invest in the fiber cable. In Kenya, it's about \$4,000 a month. That is \$160,000 U.S. dollars a year. That is for 200 people total, and that is about \$800 a person.

When we talk about people that are really off the grid, that is higher than most per capita income in African countries. It is still incredibly expensive to really get that access.

What we also see is there are extraordinary tools out there to train. They need to be low bandwidth. Ninety percent of people in and around Lagos cannot access video, which is a huge part of a lot of the training's that are out there. We're trying to repackage and get all kinds of information out there such that people that are great at this, that are driven, that want to do it, can naturally rise up.

We're trying to find ways to get training out there to see kind of who doubles up. We need other people to come in and really offer that.

In terms of what companies want, it's no different from what any of you are looking for in

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an extraordinary employee. Great problem solvers, accessible. We have to have overlapping, they have to overlap with regular working hours and be able to instant message, do stand up's, and have video conferencing and all these things.

We have doubled and tripled down on soft skills, meaning one full month at the beginning of the program where we say pause on your technology training, now we are going to talk about when there's a problem, when you're not going to deliver this on time, how you communicate that very, very clearly to an employer. That has increased.

We've had clients that have threatened to drop our services just because it's cut off, just because technology, the Internet cuts off in a middle of a call, and I can tell you it's frustrating at any point in time, but when you pay \$10,000 a month for Internet and you have a client on calls, to have the generator go out and there is a long annoying beep, and then it takes about 30 seconds for the inverter to kick in.

The environment in which we operate is absolutely critical, and obviously we can't solve all those on our own. It is very resource intensive to be able to compete.

Companies need to plan for that up front, what is it going to take to really offer complete broadband and guarantee their technologist is going to be there when a company needs it no matter where they are in the world.

MR. CHANDY: Susan, go ahead.

MS. LUND: The cost of broadband access in Lagos is 21 times the cost in London. There is still a huge issue about affordable access, even if the physical access is there, getting it affordable.

We just did a study looking at the U.S. economy on digitalization of different businesses and industries. The amazing thing is you might think of the U.S. as one of the countries on the digital frontier, but even here, across different sectors of the economy, there is startlingly different use of digital assets, talent, and business processes, with sort of ICT, finance, media, up on the top in most digitized, and then hospitality, agriculture, mining, health care being down on the bottom.

The thing in the industry, you can do the same chart of the leading companies that are

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heavily digitized in terms of their own business processes, their investments, and ICT per worker, and their usage of digital assets compared to companies that aren't.

It's no different and probably worse in low income countries, but there is dispersion across companies and occurs everywhere, and a big part of it, I think, is competition, affordable access. Maybe in low income countries, there is an additional information training component about helping small businesses understand what the possibilities are if you set up a website and so on.

That could be a public good provided by the World Bank or other philanthropy organizations, but a lot of it does come down to competition and the pressure to keep up with what the business next door is doing.

MR. CHANDY: Let me go back to the audience. I'll take the lady over here, the lady in the back, and this gentleman here.

MS. SAXTON-FOX: Hi. My name is Rebecca Saxton-Fox. I work for USAID in the U.S. Global Development Lab, and my question is for Christina. I'm interested to know if any of your software engineers are ending up in the public sector, and if so, I guess why, and if not, why.

We are working on this in the U.S. as well. How do you incentivize good people to go into the public sector rather than the higher paying private sector.

MR. CHANDY: Great question.

QUESTIONER: Hi. My name is (Inaudible). My question is about -- I actually have two questions. One of the problems you talk about, the analog components, is very much lack of digital literacy by the population. They don't even know what "ICT" is. They think "ICT" is equipment or IT. They have little knowledge of what is the Internet. Also, there is a lack or a will of the government because they have been using that lack of knowledge to hold over the citizens, so the information is power, but the information is not getting to the people. That is one question.

The second one is what happens when countries don't have the political will or from the president on down, if they don't understand ICT, they don't understand the impact, then it's very difficult to get anything started.

MR. CHANDY: Great.

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MR. BAGROW: Hi, Stefan Bagrow with the United Nations Economic Commission of Latin America and the Caribbean. Super long title. (Laughter)

My question to the panel is if you guys have thought about the way that digital technology can work in refugee situations, and whether or not thought has been given to how we can assure that whole generations don't fall behind, especially as they hopefully will re-enter economies where it is possible to connect to the global market and how we can work to ensure they are not lagging.

MR. CHANDY: Great. I want to start with Jonathan, and I'm going to slightly spin this question about digital literacy to allow you to speak a little bit about -- sorry, about political will -- to allow you to speak a little bit about what has recently just gone down in India and Egypt.

I think the India Government would say they are a great advocate for instant use, but they are not allowing Facebook to provide a package of free services for limited instant access.

Could you provide some comments on that dicey topic?

MR. DONNER: First, I think the digital literacy question is an outstanding challenge, and our own literacies are lagging the technologies and potential technologies themselves. There is a component to get that up to speed and deployed at scale, definitely.

On this question of sort of political will or the politicization of infrastructure of delivery of the shape of the Internet, I think one thing you can say about what happened in India -- I don't know as much about the Egypt case, whether the same ruling went down or not -- in India, basically, Facebook rolled out a program which allowed individuals to access Facebook for free on their phones.

They dressed it up. They put it inside a little offering that included Facebook and some information if you're a farmer, and some good health information, a bunch of stuff that looked like what you would dream up if you sat around a conference table and crafted the greatest hits of MFD, Mobiles for Development, and put it altogether and made it free. This is basically Facebook plus all these things around it.

They deployed it in several countries, clearly without a lot of incident, not a lot of evidence because there was not a lot of scrutiny.

In India, just stuff went crazy. They have a million letters, online submissions, back to the

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telecom's regulator there, with people largely protesting this program based on it being a violation of net neutrality, that not all bits are treated the same, sets up distortions in the marketplace, makes competition tough, stop, stop.

After a long pause, India's regulator said stop. In India, you can't price discriminate on bids over the mobile channel. What I think is interesting about that is it's a mobile question, it only comes up, you only have this fight because now people have to pay by the bit, and it is because they have mobile and they don't have other means of Internet access.

I think it can be nothing but good for the literacy conversations, no matter how you feel particularly about protecting net neutrality in this case, and I'm kind of on the fence about it because it's nice to get Internet when you have no Internet and you can't afford to pay for it. You heard me say that earlier.

However you feel that the net neutrality issue, the fact is it sort of crossed over from being something like in rooms like this and kind of just people talking about what the shape of the Internet might be, to be something that the public cared about, is pretty important, because that's going to be a part of -- everybody's society is increasingly constituted by the locations and the structural flows and information flows, and the shape of those flows, which is determined by the algorithms and the shape of the software and the rules of the software platforms on which we are interacting, I sense that every country has a stake in trying to make what is best for that country.

MR. CHANDY: Interesting. This big explosion has been good at least for a while now, so we can think about what digital literacy is.

Christina, do you want to make a comment about public sector? I assume it's too soon for you to place someone in the Nigerian Government. (Laughter) The top .01 percent of your talent pool decides they want to become a civil servant, is that ever going to happen?

MS. SASS: It's a great question. We are two years into a four year fellowship, and have not graduated anyone out yet. We are planning exit paths, and the ones I mentioned, entrepreneurship, helping us to build and scale and other similar things, CTOs, companies, and governance.

It's going to be a tough sale. People are looking at the hottest employers that are

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building the hottest tech products. We are deeply invested in making growth equitable and looking at local fruition. That is a huge part of keeping tech talent right there where it is.

We are already doing projects, with Uber in Lagos, so looking at all kinds of different ways to support home grown solutions, but this is going to be a tough sale. We are already working on it.

Two of our earliest fellows who are extraordinary leaders in our program, I refer to them as "Minister." (Laughter) We have had great support from Minister Johnson, former Minister in Lagos, to help. They have done lots of different efforts to get people on Upwork and on Freelancer, and they have helped us spread applications and spread the word.

It is hugely important. We need a tipping point of people in governance that have exposure to cutting edge technologies, and think of the equitable spread of it as a great career path.

I think there will be a very small subset, and I think it will be critical of transforming the sector. We are hoping if we can get four or five of those in the next four years or so, I'll be thrilled.

MR. CHANDY: It's not just a problem for digital skills, and all the great African economists who go to graduate school in the U.S. will end up back in the National Statistics Office in Nigeria or the U.S.

I want to give Deepak a chance to talk about refugees. Did you look at this at all?

MR. MISHRA: There was a bit of discussion on natural disaster management and how technology can help, but not so much with the refugee situation. If at all, we have a positive story about how in terms of it helps -- Somalia is one of the most wired countries in the world in its neighborhood, and largely because they have a large amount of migrants, and everybody in Somalia knows how to use the Internet and by phone because they have to connect to the rest of the world. We think there are a lot of positive stories.

MR. CHANDY: There was a survey done by the IRC, one of the first questions refugees asked when they arrived in Greece, and it was one, where can I get free W-Fi, and two, where can I plug in my phone.

QUESTIONER: One is digital literacy, but you also have to think not just about digital literacy but (Inaudible). Twenty-two percent of the adults in the world can't read and write. What do you

do?

There is a massive surge among those people who can't read and write who now want to read and write because now they want to use a mobile phone. Finally, they realize the benefit of literacy.

The second is when it comes to accountability, there are lots of governments who just do not want massive Internet penetration in their countries. Kenya and Ethiopia sit next to each other. Kenya has 45 percent Internet penetration. It is a 4,000 a month for access. There is a reason why Ethiopia has been very reluctant to do it.

There are governments who are unwilling to provide that. I'll give you one example. In Estonia, public services are online. You can start a business in minutes. You can file your taxes in seconds. The Estonia government was trying to provide some of the services saying we have this good service, freely available, we will of course charge you for some technical assistance. (Inaudible)

Clearly, it is the same technology, but it depends on accountability, it is the information plus accountability that gives you wonderful stuff, information minus accountability gives you state controlled.

MR. CHANDY: Based on that note, we are going to wrap up -- we only have about 5 or 6 minutes. It is such a great panel here. Before I let you applaud them, I just want to do a plug for everyone on this stage.

You all are going to go read the report, and you will be tested on it next week. (Laughter) Susan's new report coming out tomorrow. Jonathan's book, which I was reading last night. It's actually a really wonderful read and I would encourage you to have a look. I'm not plugging it, but it speaks of a lot of the issues we have been talking about today, especially people's experience with the Internet entirely through mobile phones. Finally, look into what Andela is doing, it really is quite transformational.

Thank you so much, everyone, for coming. (Applause)

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