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PANEL 5: ROOM L, SOCIALLY INCLUSIVE AI

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>> Okay. Good afternoon. Can everyone hear me? Okay. So congratulations for finding the meeting room. That's a big challenge coming all the way from the other building and passing through our second building. So congratulations for finding the meeting room. I would like to welcome all of you this afternoon to this panel on socially inclusive AI. My name is Doreen Bogdan and I'm the chief of strategic planning membership here at the ITU.

The central promise of the 2030 agenda for sustainable development is about leaving no one behind. And if AI is to advance the sustainable development goals which of course is the theme for this summit, it will have to benefit all with no exceptions. Socially inclusive AI is not an option. It's a must.

During this panel this afternoon, we will look at how we can be inclusive in the opportunities that AI has to offer. We will also look at how we can be inclusive in the creation of AI. That's something that was just touched upon in the previous plenary session.

This means to us in particular in the ITU first and foremost that we need to bridge the global digital divide. As Auburn Secretary General mentioned this morning there's still 3.9 billion people that are not connected to the Internet. So there's lots of gaps out there. There's the gaps amongst those connected and not connected. But there are also gaps that are based on race, on gender, on sexual, political, cultural orientations. Also on economic inequalities or even access to ICTs for persons with disabilities. We need to make sure that the implementation of AI does not exacerbate existing inequalities.

As we turn to the development of the AI side, Kate Crawford, a Microsoft researcher said that AI will reflect the value of its carets and that new technologies like all technologies before are influenced by the people who build them. So how can we avoid exacerbating social bias and inequalities? In particular, we're going to be zooming on SDG 10 which is reducing or getting rid of completely inequalities. Those responsible for building AI need to be representative of the population that they are intending to serve.

Our panel this afternoon will let us know how they are each taking steps to address these issues as well as how they are taking steps to address the critical issue of the lack of talent and skills in this area. There's a real talent gap that we need to also be addressing. We're also going to be looking in our panel at issues around accountability and transparency as two key components of ensuring inclusiveness. Of course the principles of nondiscrimination, transparency and accountability need to be built in to the operation of AI so that automated decision making processes are transparent and accountable for the analyses and decisions that they deliver. Also at the core of this discussion is the issue of data. There are calls for the democratization of AI regarding access to data, transparency in who owns the data, harmonizing datasets, and how that data should

be used for the benefit of humanity.

With that, I would like to introduce our stiller panel here this afternoon. I'm going to introduce them first by name and then come back and say a few words more about them before I hand over to them for their first question. So we have Cathy Cobey from EY we have Saska Mojsilovic from IBM research. Welcome. We have Eleonore Pauwels from the United Nations University. We have Rebeca Moreno Jimenez from UNHCR across the street. And we have Sharada Mohanty from EPLF. Thank you for being here. We're going to hear first from Cathy. We will go through each of our panelists with a question. They'll take about five minutes. Then we will turn over to you here in the room in Geneva and then to our remote moderator and see if there are any questions coming in from those around the world that are following our discussion.

So Cathy, first over to you. Cathy is a partner EY she heads up the global team that is considering ethical and control implications of artificial intelligence and autonomous systems. She has leveraged her unique background as technology risk advisor and she's been involved with EY's climate change work as well as sustainability work looking at kind of the full spectrum, as I understand, of technological and societal implications around intelligent automation development.

Cathy, maybe you could share with us what diversity means to you. We know it means different things to different people. As a woman in tech, what does diversity mean to you?

>> CATHY COBEY: It's a really good point that diversity does mean a lot of different things. Certainly I think about diversity from a gender Perf. I know back in November the world economic forum released their latest gender equity report. It was discouraging to see they have increased the number of years it will take from 170 years to 217. I think a lot of people have represented that as moving backwards. I tend to think of it as we got better data we're better understanding the depth of the problem.

I think there is quite a bradyof issues that are the root cause of the inequality that has to be addressed. To tell you a story. I became aware of an all girls robotics teem called the Afghan dreamers. They overcame a ton of challenges over the last couple of years in order to be able to compete at the first robotics world champion in Detroit last month. As I was digging in their story I was amazed from January to the beginning of April, they had just been down the street from my home. They had been invited by a girls school in okayville Canada to come and study and work with them. As I started to reflect upon the different experiences that those two girl groups came to their particular positions, the girls in Canada haddive parents. They had robotics camps and funding. Where the girls in Afghanistan had to fight everything. Their parents were not understanding why they were interested, were not supportive. They didn't have any science or tech programs. They didn't have money for equipment. Yet they all came to the same spot to that one place in Detroit.

As they now go back to Afghanistan, they have no post-secondary STEM school. There is an organization to try to raise funds for this,

but there are so many systemic barriers in their way in order to make it into a STEM career. I think that is 7 girls out of 2,000 that originally applied to the program that actually got to have that kind of experience.

How can we address that kind of systemic inequality where that whole group of girls is so limited in their accessibility? They talked about how they had arranged to go to some local scientific institution. And the male scientists wouldn't allow them to use the equipment. They felt the girls couldn't use that kind of technical equipment and would break it. We need to be thinking about how we address those more systemic problems.

I have two daughters. They're age 20. The other thing I think we need to realize, I try to push them into STEM. I was trying to get them involved in that area thinking it's the future. They really had different interests. One wants to do law and justice. The other film production. I've talked to them about what the future looks like in their areas of interest. Recognizing they still can have an important voice and Perf in the evolution of technology in their chosen paths. As we think about bringing more diversity to the development table, you have to recognize it doesn't always have to come from a STEM background. I'm an accountant by background. I bring diversity to the table with the per expectative of accountability, of risk, of how to build in controls. So we the whole number of Wim that are employed in different areas, have different perspectives that can come to the table today even if we don't have that formal STEM background. I was self-taught. Others can be as well to have a meaningful voice in this conversation.

>> DOREEN BOGDAN-MARTIN: Thank you. Thank you very much for sharing that. I think that's a really good point about you don't have to come from a STEM background. I think that's often miscommunicated in the ICT industry that you have to have a STEM degree in order to excel in that space. Thank you for sharing that and your daughters. I have two daughters and have been trying to push them into the STEM field as well. It hasn't entirely worked out. We can talk about that later.

Now, let's turn to Saska. So this is sort of AI at work in the building. It depends on whether it's sunny or shady and hopefully they can bring the shades back down and keep them down. Apologies for that. Saska, we're going to turn over to you. Saska is a scientist heading up the AI foundations at IBM research also co-director of IBM science for social good and an IBM fellow. She's a fellow of IEEE as well and a member of the IBM academy for technology, also an author of some 100 publications, if I understand correctly. And holds no less than 16 patents. Wow.

Saska, can you tell us what inclusive AI means to you?

>> ALEKSANDRA MOJSILOVIC: Right. Hello, everyone and thank you for having me here today. It's a great pleasure. So when I thought about this question and about the panel and I thought actually there's many, many things that really mean inclusive AI. They're all very important. I decided to focus and directly related to the job that

I do, actually two jobs I have at IBM research. The first one is I lead our artificial intelligence foundation department which is basically a very place where scientists try to push the frontiers of artificial intelligence research like Machine Learning and reinforcement learning. One of the areas where we put a lot of effort and energies, this notion of algorithmic fairness and fairness in AI systems.

The reason is I'm pretty sure you've read about it. It's all over the place in the news and rightfully so and sometimes maybe a little bit more with the PR spin on it. But whether we want it or not, we live in a world that is prejudice and biased. I think there are about 180 biases that are catalogued, human biases that are catalogued. As we collect the data to train our systems or as we put that data into our AI system, these biases get propagated and needless to say with AI they get scaled like never before.

So one of the areas that we do really fundamental work is really trying to understand how we can use science and algorithms and engineering principles to essentially keep the biases out of AI. That involves many things from learning how to detect biases in the data to being able to detect biases that are maybe introduced by the models in algorithms, detecting biases in black box models such as APIs, all the way to teaching AI how to be explainable and interest bearing. I believe just as AI in its infancy this area is still in its infancy. There's enormous potential. I look forward to seeing more of that in practice.

The other aspect I wanted to talk about is really the ability to make AI, the benefits of AI available to everyone and to all kinds of problems, especially humanity Aaron problems not just big revenue making products and services. (Humanitarian) one of the things that I'm trying to do. Three years ago we started science for social good where we partner with NGOs and public sector agencies and social enterprises. We try to understand the challenges that they're facing and the problems that they're working on. We try to see how technology and AI specifically can help. We try to see if we can come up with new technologies or new solutions and prototype them.

The reason we do that is obviously because it gives us an outlet to use our skills in an area where they're very badly needed, but also because the scale gap between the companies like IBM and Microsoft and Google, the companies who can afford very expensive AI researchers and NGOs and other organizations, the scale gap is huge. This program is one of our ways to essentially illuminate the world about it and tell the world, there are so many opportunities. There are so many ways we can use AI in addition to creating consumer goods and products. Much more important than that. Letting people know that this is something that we should be thinking moving forward. So I look forward to discussing it more with all of you on the panel.

>> DOREEN BOGDAN-MARTIN: Thank you. Thank you very much, Saska. I know Rebeca will pick up a little more on some of the humanitarian issues that they are addressing at UNHCR when we come to her. Before I turn to Eleonore, I've just been informed that the pigeonhole app

does work. If you have a question and you were using it in the previous session, you can send in your question to pigeonhole. You don't have to specify your name if you don't want to. You can also if you're following remotely, as we said, send it in on the remote participation interface as well.

So now we're going to go over to Eleonore Pauwels. Eleonore is a research fellow in emerging cybertechnologies. She is with the UN office of the United Nations University. Prior to taking that position, she was the director of anticipateory intelligence at the science and technology innovation program at the Woodrow Wilson international center for scholars. She's also a writer and an international policy expert what specializes in the governance and democratization of artificial intelligence and converging technologies. Eleonore, we're happy to have you with us if you can show us how we can start building a local democratized AI innovation ecosystem.

>> REBECA MORENO JIMINEZ: Thank you for this exceptional meeting. Let me start with a brief diagnosis maybe. The scope of the exclusions we could be facing in an AI global economy. So the convergence of AI, and sciences is giving ways to algorithms that can successfully analyze us and communicate with us. Far beyond information AI will assure a new form of pervasive and effective computing which promises to augment all the ways we behave, all the ways we function, we interact, and we create value. It goes far beyond that. Some envision that ubiquitous computation as a way to optimize our economies towards sustainability. Others anticipate the exclusion of existing and new minorities. And those are the ones that will be excluded by biases that are baked into the processes, are those that cannot acquire the skills and creativity that can add value to computation.

So most everybody agrees that we're facing significant uncertainties of philosophy and scale that can affect the governance between tech makers and tech takers that are making (?) AI might create significant changes in Silicon Valley. Locked in this competition race, the rising tech platforms may not see the incentives to optimize for public good, share benefits, and mitigate complex social (?) The dynamics of exclusion could effect not only which nations try to design and deploy AI but it's global long term implications. You see on the slide a map of AI global talent. We need collective questioning about how symmetries are shaping AI innovation and what diversity exists globally. This sounds impossible at first. Yet, it could be different.

I'm going to show you now it's a map of what we call fab labs, fabrication labs. They are community labs where you can work on different converging technologies and produce or invent anything you want. So AI could become a form of democratize computation if we create high systems where the creativity and knowledge of citizens in different countries can be augmented by virtual intelligence. A year ago in a citizen science lab I met a young girl from Mexico who learned with the help of her mentor, she used how to use AI to create a biopatch that could be treatment for her father. He has a disease with lung. She came up with the concept and came up with a way to how to use those

tools for that treatment. She's 15 and she's curious. She has already acquired most important skills for future which are the drive and creativity to make AI work for her own biology. Picture with me a scenario that we hope to implement. We've been working with the lab for years. The scenario but the main concept behind that reality is actually coming close to concretization and that is the impulse of AI and tech convergence.

So imagine this. It is 2025 and with the help of many open AI companies citizens science labs or fab labs have become a prototype in many industries all over the world. Remember the map, they're basically covering a lot of countries.

So these community labs have fostered among diverse classes, old and young, innovators, the capacity on how to harness effective computing with complex technical challenges. While also building skills for the future. You have the pioneer exploring and you have the maker, the one using AI for intelligent design. You have the hacker, the one that breaks AI system to democratize next models and then the work that anticipates implications of virtual intelligence. So we become -- AI assisted surgeons and others will be genomes for good. They're all responsible socially active. They understand themselves whether there is a critical well being in the ecosystems. They will fabricate. The next two foster the future. My question is around this idea what if they could be globally connected but locally inventive and inspired by diversity of knowledge and vision? If you just give me one minute. I've been looking at what AI systems do very well. It's what we call diagnosis. It comes from the following (?) Those will become better with that kind of knowing. Knowing all of its dimensions goes far beyond computation. The limit of the world is probably to learn better.

>> DOREEN BOGDAN-MARTIN: Thank you. Thank you so much, Eleonore. Now we're going to turn to Rebeca Moreno Jimenez who is a data scientist. We need more of them today. I think you're our only data scientist on the panel.

Rebeca is from UNHCR which is the United Nations refugee agency and she's working in the innovation service. She has supported several UNHCR field operations from Latin America to Europe to east Africa and to the other countries as well. She's been focusing on the potential of data science, artificial intelligence and BigData uses for enhances for protection and decision making. So Rebeca, can you tell us why the human centered design approach is important in the implementation of artificial intelligence-based projects? And if you could also tell us how UNHCR is applying them in AI-based projects and maybe give some concrete examples, please.

>> REBECA MORENO JIMINEZ: Thank you. Thank you for inviting the commission for the agency to speak about potential applications and how AI can be socially inclusive. I'm going to talk about our mandate and it overlies. Our mandate is to protect people, those who are forcibly displaced and who is without a nationality. With that in mind, our mind relies on people. Anything is implementing artificial

intelligence and it has people. (?) There's many implications in the humanitarian sector. Our countries like U.S. and Switzerland are trying to explore the potentials of resettlement based on AI or inclusion in the -- because it's very, very complex, very multidisciplinary. Inclusion means a refugee that is newly arrived into our community that needs to be included. Maybe he doesn't speak the language. That relies on a lot of human processes for that refugee that has newly arrived to become part of that community. Inclusion can be in the part of digital identity. The refugee has an identity in general can avoid the tension. That's also another way of seeing inclusion. Inclusion could be a person that is displaced that has been forced to flee because of their gender. So they have been persecuted from being from the LGBT community and recognize the inclusion of gender. The inclusion for us is so big. You need to have that at the human centered approach. What that means for us specifically, one concrete example was back in 2016. Back then there was a major refugee crisis. We were overwhelmed by the amount of displacement especially in Europe (?) What happened we wanted to find a movement. The data science team with me and a lot of people on the team are here. We're obsessed with movement. This is something we're trying to tackle. We're doing research about it.

And we started trying to find movement maybe intentions for moving for persons concerning social media to see if they were saying about their intention to flee. What we discover -- this is something we have help -- thank you so much. UN globe which is a panel help us with research and resources. This was started as part of the (?) They were leading the movement over the winter. What happened? At least in the data sources that we were looking and we're very worried about acknowledging and we wrote a paper about why we didn't find movement. Maybe it's not the preferred form of communication. Maybe people don't want to share that they're moving for whatever reason. What we did find was an interesting correlation between the terrorists incidents that happened during the year 2016 and '17 and the public opinion of refugees in different languages. So we analyzed approximately, you saw the number, 350 million in this case (?) The importance of data and we went to find specific what were the host communities talking about them? Refugees themselves if they had some opinion in those communities and we saw a correlation and a spike in the terrorism -- the amount of tweets or opinion either from the general community or host communities or somebody tweeting in German doesn't belong to the German community but maybe they do. That's an assumption you need to underlay. So in that case we train the machine and I wanted to see -- this is commercial software but we have used specifications that we have built on our own. (?) That's a training dataset. Terrorists and refugees (?) Number of refugees. If you go to Berlin these are trained by the machine. So we put the human roots and we put our own human rights-based approach which is the definition of human rights (?) And the machine data work we needed to refine it a lot because the machine was crazy finding things that were not related. We found that the results -- I don't know if you want to go to the presentation, it's a very, very

alarming number that I want to share with you right now. It's a narrative that is based in two concepts and the concepts is fear and protection.

It's really funny because fear and protection are exactly what is in the 1951 convention for refugees. We are protecting the refugees, people with the fear of persecution for many reasons, political opinion, race, religion, anything belonging to a certain group. Because of that our mandate is to protect them and to make them -- finally what we find on Twitter the narrative of some of the general public actually foster and media, not all media, is a fear of refugees perpetrating the attacks. Refugees are fleeing from the attackers which are terrorists. And that governments and maybe some close communities need to protect themselves from them and to raise borders and close borders. So that's something that we find thanks to AI. That's one of the many applications.

I think maybe -- allow me one minute to talk to the other project. This is just on design. It's just very, very quickly. We are also in our application is human resources and trying to find the best underwriters. Why? Because the challenge that we have in the agency is that 65 million people are forcibly displaced. 40 million are internally displaced within their borders. 23 plus, plus are in crossing borders. So we have needs, protection needs, child protection as you leave areas. Anything that is related to needs of a human, water, sanitation, it's overwhelming. We need people to fill those gaps, people that are experts on these topics, people that are exposed to the local languages and people ready to be able to serve in an image in deployment. Human resources team talked to us. We kind -- we explore many commercial softwares but the rules to hire someone because of child protection is very, very strict. You can't use commercial software to compare (?) We need to build our own solution. I wanted to show you two different solutions. One is based on commercial maybe like company software, one we need to build on our own because of the specific needs a refugee has but to see what the implications are.

>> DOREEN BOGDAN-MARTIN: Thank you very much, Rebeca. We'll come back to you with some follow-up questions on that great work that you're doing at UNHCR. Just to remind everyone, you can send in your questions, as I mentioned before on pigeonhole after we hear from Mohanty. We're going to Mohanty is a researcher and biotechnology and bioengineering PhD student at EPFL. He has been working on diversity problems of applied Machine Learning. He also co-founded crowd AI. I think you're going to tell us a little bit about that. It's a platform, as I understand it, for organizing Machine Learning challenges and problems and an open science way using open data. So Mohanty, we've heard from some of our other panelists, their views about bias.

Why don't you tell us your views about bias and how bad it is, please.

>> SHARADA MOHANTY: Thanks, Doreen. I will be focusing on just the notion of bias in AI because we keep hearing this bias in AI in passive discussions in media and many other discussions. So what we commonly hear is that bias is bad and it always ends with a question mark and in many cases an exclamation mark. It's not as simple as

that. The statement bias is bad is an oversimplified account of a complex phenomenon none that we're dealing with.

Each one of you here in this single room are kind of biased because of some shared ideologies or shared cultural context or just part of being human.

In fact, if you look at -- this clicker is not working. In fact if you look at this info graphics, you see in the circle are some kind of bias that each one of you have subconsciously that you don't realize. It's actually well studied which brings us to more common ways to actually see these biases in our collective knowledge that is kind of captured by these engines like Google where you basically use Google to somehow basically see what kind of bias is present across (?) Or some other examples like that. A very common one that all of us live in our digital life is our social media where we always have it contained which is limited to our own work and something we find interesting but that is kind of a bias that is imposed by us by the social media platforms.

So to go back to the war against bias which we read about a lot, here are some examples where this -- where the guardian reported how white -- which is dangerous for black people. This was another example where something by Google which was trying to classify images would classify certain people of certain ethnic races as guerillas which was by the moving the class of guerillas. I think it's better if I move it a little bit.

So, again, this was one example where the classes were basically started capturing these artificial datasets. (Off mic) another interesting study --

Feedback) and how many patient datasets would work on different? Off mic) this research basically showed that the classifies (off mic) then when you see these approaches are being used for input and being maintained (Off Microphone) you are supposed to ask -- then you're supposed to ask about the implications of bias in general, how bad can it get?

So we basically formulate (?) We cannot understand (Off Microphone) the creation. So going back to the ways in which these Machine Learning models work, traditionally we used a lot of mathematical models and then moved to hybrid models which use mathematic and data. (Off Microphone) a much better understanding that we simply present the distribution, for example in this case this notion of pictures. (Off Microphone) so where is this bias? It is actually everywhere. How can we address something like this? We have to start with acknowledging the existence of bias.

Then we have to find the scope of bias and also do some (Off Microphone) for example, we should not say (?) To give you an example, this is something (Off Microphone) by making it easy for you to track your own (?) This works really well for what we actually use. It doesn't work that well if I basically put in my images in there and then the starts going crazy. So this would be supported by the media in general (Off Microphone) and religious (?) That is something that is important when you're designing these tools. It should be very important for the creators of these tools to clearly define the scope.

Then we go to (Off Microphone) different models of the important challenge we're struggling with. For example, if this was developed from my own research to come up with models which give diagnosis about these (Off Microphone) this basically has this cancer and you come and ask why and it goes I don't know. That's really not going to work. (Off Microphone) then another important part is to fight these biases. The most important part is to empower everyone to fight these biases. For that we actually started crowdAI, a platform where we (Off Microphone) in designing these models and the results. Co-incidentally we have Lucas who is an active community members who brought 600 people around the world and how to (?) We make sure everyone is well represented which is a harder problem. These problems are not actual the onlyingcal problems but cultural challenges which we have to address and have to find answers to these problems for which we don't have a good solutions or a good policies.

>> DOREEN BOGDAN-MARTIN: Thank you very much Mohanty. Very complicated. Thank you for laying that all out for us. Afterwards I'm going to come back to you so you can tell us how we can fix it. So we did have some questions that came in through pigeonhole but maybe first in the room if anyone wants to raise their hand and ask a question. Otherwise, we will take the questions that are on the screen.

So we can take the questions on the screen. So we have three questions that are being asked. The first is, what role can policymakers play in ensuring inclusion? The second question we have heard that AI exacerbates exclusion. Can it also help foster inclusion? And then the third question, on what kinds of incentives can we create to promote inclusion?

So with those three questions in mind. Who would like to go first? Saska, go ahead.

>> ALEKSANDRA MOJSILOVIC: Policymakers play in ensuring inclusion. That's an interesting one. I think there are already areas in industries that are regulated and where inclusion in a way is already placed into the box. For example, in United States you cannot offer insurance or credit score rating or decision that is based on gender, race, and many other attributes. Similar in housing, similar in workforce like job discrimination. So some of these things were already there because of the previous technologies, but I think what is incredibly important as we start using more and more decision support in our lives is that we kind of understand what are the additional implications and what are the kindses of things that we should or should not be regulating. So obviously regulation is one way to help a lot.

However, having said that, that's only one way because there are many others. Right now in the place in an application that's not regulated, we rely entirely on the developer of an AI system to be aware of what inclusion means, what bias means, what fairness means. It is a hard thing to do. It requires subject matter expertise. It requires sometimes being able to visualize all kinds of bad things that can happen because of an unknown product or an unknown thing that someone is putting on the market.

So as we keep on developing more of AI, I think there's going

to be an increasing number of new mechanisms that we're going to be putting in in order to foster inclusion.

First of all, I believe that the inclusive AIs, bias checkers, fairness, service checkers will become a part of development tool kit so the development -- the developers are not the ones who are solely responsible but that they have the tools and platform that support these kinds of tasks. . We also see models that are coming. We're seeing auditing agencies showing up or consulting firms that are showing up that are beginning to actually either certify or check the algorithms for inclusion or fairness and biases or are advising their clients what it means to be inclusive. This is a completely new thing. We've never seen that before.

I also believe there's going to be something that can equate to a marketplace of service certification. As developers put new APIs into the tools or on the marketplace, it is conceivable to think just as we have an application marketplace in Apple store. You give five star to an app. It is conceivable that there will be fairness checking the apps that are out there by third-party developers. I think the point is this is a completely new world we're in. It's a personal belief. I think it's going to a be balance of all these factors that is going to be responsible for ensuring fairness in the long-run moving forward because it's a completely new territory. And to some extent it's still an unchartered territory for us.

>> DOREEN BOGDAN-MARTIN: I was just going to say --

>> With my background being an auditor, I on Friday had a half day conversation with a number of my practitioners to talk about how we can provide at the firm that third-party independent assessments and assurance but we recognize that with the development of AI and the technology, I was coming in at the back end of the technology development is going to be very counterproductive. So we really need to be there at the design table to be talking about how do you build in design into the development. How do you make sure you have the right people at the design table? How does a governance structure, whether it's a set of ethical standards or a board that are being applied and making sure that there's that awareness.

I think that's -- having been in this technology risk space for 20 years, I'm really happy to see that this early in the stage of a technology we're having this conversation. Because I've been around with other technologies and these conversations weren't happening at this early of a stage in the technology. I think it's a sign that there is this societal agreement, if you call it, or consciousness that we do want to develop this technology in a socially inclusive and transparent and trusted manner. I think it's just important that we all in our respective roles in whatever this development ISOC is that we put on this responsibility. I've been doing a lot of studying on ethics. I'm concerned about separatism where I can separate my role where I just take orders and someone is making the ethical and moral decision. We can't forward for AI to be developed in that session. If we're talking about blockchain, Internet of things, BigData, they're all interconnected. With we all need to take on that responsibility.

>> DOREEN BOGDAN-MARTIN: Eleonore?

>> ELEONORE PAUWELS: So I'm going to try to this notion to foster inclusion and kind of reinforce what Rebeca has been saying. So I think when we need to do a paradigm shift. We need to avoid -- (?) Knowledge experiences and values. We have to do that for different kind of technologies. I have gathered a few examples of AI applications that have been developed recently that really need what we call a form of tacit knowledge or experiential knowledge or what different groups in society go to as they leave. For example, how can you design and improve an AI improvements for refugees or soldiers with PTSD if you don't integrate their own experiential knowledge in life and conflict means? How can you develop an AI application that recognizes specific viruses if you don't integrate the knowledge of people (?) And part of the ecosystem and maybe aware of other trends. Same with this app this morning about cancer screening. How can you make such an app beneficial if you don't know what the cultural or medical things are at play. What are those specific practices? This notion of how -- what are we trying to include in socially inclusive AI part of that is that experiential and tacit knowledge. That means that we need what I call community lab interventions, collective place where the bottom line and the benefits where it's a collective space where end users, citizens, first of all, young woman, really a large scale intervention where you mix this notion of what the biases are with other forms of knowledge.

>> REBECA MORENO JIMINEZ: I think maybe because we're humanitarians we see it differently. AI is a tool and you manipulate the tool to achieve inclusion. So a lot of the conversations that you're doing, yeah, I understand the design of a probably, what are we doing? You go and ask refugees. So if we think this is fair or not to be applicable or do you think this can help them or not? If they think it's not applicable or the tool doesn't fit, then we change the tool. We can use AI in some of the problems especially in an inclusive manner. Something that's important. I want to put it out there is the agency in general. A lot of the conflicts don't have electricity or connectivity. We sometimes cannot apply AI to all of the problems that we have.

Certainly there are certain issues that we can actually -- for example, data, which is huge. It's increasing and it's something that a lot of the organizations are working on. That's a very concrete application of AI in a lot of the organizations. Certainly it's one of many.

I think like you know AI can help you foster inclusion if you take into consideration (?) The culture. In our context because we work with 100 plus different countries with so many different languages, you need to adapt to the context and to the human -- anything out of local context and then you start mainstreaming from there because that's how inclusion looks like in different scenarios. And the cultural aspect is the most important. For that, I guess, organizations need to have a strong policies or code of conduct or guidelines or what it means for them to have inclusion diversity and how AI can help you achieve that goal in the organization.

More (?) Is one of the tools. I think that if we see that the problem in a different lens that when you find really helpful, you want to try to respond. (?) That's one of the things you can do with AI.

>> DOREEN BOGDAN-MARTIN: Thank you. Mohanty, I'm going to go over to you. I like if you respond, if you can pick up the question that has come in about should we just leave it to techies and tech companies?

>> SHARADA MOHANTY: I was about to answer that. Again, the notion of AI as has been practiced within the academy and industry right now in data usage basically started as something on the whiteboard of a researcher. Now it has pretty much moved into the workshop of an engineer and maybe in a few years it will actually move on to your work desk. It's actually something which is not very farfetched. If you think of something you do like Excel or spreadsheets in general, that used to be a specialty which you had to learn by spending years to understand it. Now you take it for granted and you use it as part of your everyday life. In general, in this whole ISOC, we have a a lot to learn from the open source culture and everything they went through in last 20 years.

Open source software basically has contributors from all walks of life, students, engineers, activists, everyone. And what they contribute and build together is pretty complicated to begin with. But everyone starts with one small Babe step. The community makes this baby step easy to take and makes the whole product much more accessible for everyone for the general good.

Same in AI actually. At crowd AI that is our mission to convince everyone that each one of you can contribute a lot to AI. In many cases just because of how this is a large complicated back box which we can never understand and only left to researchers. Many shy away and don't try. If you spend a few hours, it's a new skill you have picked up. When you basically look at a new AI solution that someone is sending to you, you see its short coming from our own context. If it's open source, you can contribute back and help together to build something which is more accessible for everybody in general.

>> DOREEN BOGDAN-MARTIN: Thank you. I'm going to come back to my panelists for a second round of questions and maybe Cathy over to you and also picking on the question on incentives, specific incentives so from the EY perspective and some of the programs one of' done on diversity. Maybe you can share some of the examples and incentives.

>> CATHY COBEY: I've been mulling around on that question about incentives because underlying that is a question as to who is responsible for inclusiveness. Reading the question I'm thinking the orientation is how does the technology companies, the developers focusing on inclusiveness. I would kind of shift the question and think about it more from a broader perspective as to how can we include everyone in the benefits of AI and then back into then how we have them participate?

I think just as this past week we had a number of technology companies do developer conferences and they were show casing a number of their different technologies and applications they're working on.

As I was thinking about this conference, I was thinking about from a Canadian perspective, I could see a lot of utility in what they were developing but if I was from a developing country, would a lot of this have practical application to me? So thinking about then how do we then get the technology companies to be partnering -- almost like saying I have a conference showcased here in Silicon Valley or another developing area and I have a sister group that's in one of the developing countries, when I have a technology such as a virtual assistant, I'm showing how you can use it in the developed world and I'm showing how that same technology can be used in the developing world.

And I think that that will happen when we who are currently the consumers of a lot of this technology raise your voices and say, I want you to do this differently. If we think about one of the things that happened last week is that there was a virtual assistant demo and calling AI and making a hair appointment. There were a lot of criticisms that it neverance announced that it was a machine. The developers got a lot of media questions and a lot of tweets of people saying, I want it to be announced to me that this is a machine. The developers yes we'll build that into that. We've heard you. We know that's what you want.

I think that's more than incenting, I think you have a better voice as a consumer, as a participatory individual in this technology build to raise your voice and say, this is what I want. I want there to be this technology being developed for me as well. I want to see how you're developing it for someone else.

One of the things that I wanted to bring up from a diversity of taking a bit of a different angle about one of the programs that we're doing that I'm quite proud of. Back in 2016 we recognized that diversity has a lot of different dimensionsment one of them is neural, we think differently. We actually started a pilot program to invite people into the EY family on the autism spectrum with the move to AI and technology, data is a very big underlying piece of that. People with autism have a way that is data oriented and strongly analytical. They're very good at routine processing. So we did a pilot to bring them in and have them work with us. And what we found was that they were very successful. We developed their particular jobs and their activities that would really bring up their unique skill sets. What we learned as well is that we actually had to accommodate for them. It wasn't just a function of giving them a computer and a desk and a job title.

We had to also think about that we were accommodating and including them by thinking about our working styles. Most of us now within EY (?) Coming in each day not knowing where you're sitting would make someone very anxious so we had to make sure they had a consistent working environment and the communication styles working with them had to changed. That has to be part of inclusiveness. It's not just inviting them to the table but basically changing the table to accommodate for them as well.

>> DOREEN BOGDAN-MARTIN: Okay. Thank you. Maybe Saska picking up a little bit on the incentive part but also the point about is there

light at the end of the tunnel? I was thinking about our discussion before about business models. Do we need new business and partnership models?

>> ALEKSANDRA MOJSILOVIC: Right. I think there that is a really, really huge question. I'm a big believer in technology in the sense that I believe that when we put our heads to a problem, we know how to solve it with technology. We know how to create a solution. So, for example, in our program we build a text speech lexicon. We build a prototype of an AI advisor that can help low-income individual, give them advice to stay out of poverty. So we kind of know how to do certain things. But on the other hand, developing these kinds of solutions are -- is a very expensive thing from creating the prototype, to testing the prototype to putting it in the field to making sure it works to scaling it, to supporting it. There are very few organizations in this world that can afford these kinds of things. Just to give you an idea. If you want to develop a product or a solution and if you're a big company, say you're Google, and you want to develop a duplex or if you're IBM and you want to develop a new server or Amazon you want to develop a new or Johnson & Johnson and you want to make a new shampoo. You need funding for your product. You need expertise in the area that you want to develop the product in. And you need the skills to do that. You need to have money. You need to know something about hair shampoos, and you need to have your ability to develop the formula. If you're Johnson & Johnson it's easy you have all it in house. Now imagine developing a solution that addresses a big humanitarian problem or a problem in the developing country. What happens is the skills to do it are typically really in very few places. The funding to do it is some place else. It's a private foundation or the government levels. Often there is not enough. And then the problem, the subject matter expertise is with NGOs, with people and organizations that are really sitting at the forefront in battling these problems. We don't know how to triangulate these issues today. We don't have business models that put these three things together in the same way that they are together when a big company develops a new product.

And until we find a model that will work for all of them, it's going to be really hard. That is something that worries me a lot because this gap and the technology gap and the skill gap is just growing and the AI skills are more and more expensive. I think we're kind of banking on these things that AI will be democratized at one point and it will be accessible to everyone, but I'm not sure it's going to happen any time soon. So we've got to be looking into new gain in this space that will get these kind of solutions out there faster.

H.

>> DOREEN BOGDAN-MARTIN: Great, thank you.

>> CATHY COBEY: If I can respond quickly. I completely agree with you. I know one. Things that EY has been doing the last cupping years as a professional services firm, we have individuals with specialization across a whole spectrum of designation what we've been starting to do is work with some of those local, social, or industry

groups in the developing countries on a not for profit basis, basically giving access to the people. A lot about it is not fixes the technology. The organizations don't even have the management skills or the human resources skills. They don't have the financial skills. So the technology would be the easy part for them. The problem is if you put in just the technology and you don't have all those other management skills, at best it's going to be ineffective. At worst, it's going to outright fail. We're dealing with some of the productivity issues we discussed earlier today which is more than just a deficit of technology skills. There's a lot of different knowledge and skills that also need to be addressed at the same time. And that's where I think -- I was thinking about the incentive question as well.

The other thing that developing countries can do is like a pay to play type of model. Data is so -- it's such a huge fundamental requirement right now. Right now a lot of countries and individuals as they start to get on to mobile and phones, their data is just now being consumed into the broader data model. Is there a way to basically have our agency look, we're going to you now play in our park. For that, we expect that you're going to create the technology institutions. You're going to create the management centers. You're going to create the local jobs to stimulate and bring up the -- that's something we need to be pushing more at the policy level.

>> DOREEN BOGDAN-MARTIN: Okay. So Eleonore, over to you. Saska was mentioning the point about democratization. Maybe if you want to jump in there and share with us your views about what are the preconditions to actually get there?

>> We were talking about that table where we have them talk about their concerns. I think that table doesn't exist most of the time. That's a problem. We need to rethink what kind of collective space can be used for voicing those concerns for different types of knowledge. That's why I was trying to describe these labs because I've worked with them for a long time. So those fab labs can be working on different technologies and integrate some of them. It's a space where you create, invent, develop skills, and develop and integrate a specific kind of knowledge that you need for serving problems that are local or new or just to use creativity. We keep talking about a gap of skills but why not letting citizens have access to global civic trusts you can have different legal forms for those shared data repositories.

A way you can turn our own data, design into innovations. A design imagined by one company may not be what we need or what we want. You need those global -- you need a collective commitment to include that experiential knowledge that tacit knowledge. I've seen from Yukatan in all parts of the world I've seen people inventing new design and using 3D biology or AI to do so. How do we empower that? That means funding. But that means also (?) Why can we create fab fellowship or citizen science fellowship where people in the industry, AI talent, can visit some of those labs sometimes in their life and help distribute some of their learning, some of their skills. That could be an interesting model to democratize not only the tech but the knowledge and mentorship.

>> DOREEN BOGDAN-MARTIN: Rebeca, over to you on the UNHCR side in terms of challenges and kind of the partnership model that you have in place, what are the kinds of challenges you've been facing and what are the ways we can overcome them and scale some of the solutions that you've come up with. 3D.

>> REBECA MORENO JIMINEZ: There's many different challenges. The challenges are 5, there are many but if I can collect at least five. One is (?) Yet, again, we're working in very different places and sometimes AI is embedded into the AI applications are for data sources but for social media. Perceptiveness for people posting on social media is only representative to those (?) The machine can recognize the language. There's many roots (?) The building application that actually recommends. Which is something you don't find very quickly in some of our commercial type of tools that we have or (?) Not something that needs to work. The second one which was mentioned already how it's applicable to humanitarian from humans and machines. From humans training the machines. Humans are the human resource project I mentioned. Humans are selecting people to work in a certain company or an organization have their own bias to select. Some of the people that we have intrude because we have been working with the human resources team and people that have worked for many years trying to get the best underwriters to work in the most remote places in the world. They tell us I look at this, this, and this. So you look at the cover letter, right? Yes. That is one of your languages, right? Yes. So you're biased to those people who have (?) Common language. For them to be able to recognize their bias, that's something that is in (?) Also if you're training the machine, the machines can help overcome that bias. For example, you're looking -- trying to respond to the question for certain profile say in IT or logistics within management or security which are kind of like male sectors and humanitarian sectors. You can tell the machine find me from this -- 90% are going to be male. Find me the best Wim. You can do positive bias in the machine to do that. I think in the context we find that it's important that the machine (?) There were certain words how they were referring to refugees. They were using the hashtag refugees. Oh, yeah, the policies with refugees is making that the machine would think is actually a positive comment which is actually detrimental. Sarcasm by the way. So the machine can't detect that. I think the fourth very important is data protection and we are huge in the agency for data protection. We have one of the soundest data protection policies actually (?) The European protection regulation. What we do is because the data is being handled by a machine, not only personal data from the organization. The data that people could potentially be the pride of life. They're persecuted and requesting political asylum. They're fleeing from torists. There's a data breach and you're not able to have ethics on data protection policier we're criticized for not sharing that data. We can be a part of a lot of mechanisms to protect people. (?)

Finally in to respond the question which are the incentives. I'm going to say my now Mexican data science Wim in the UN. The way you

incentivize people -- you see you're going to see western male leading the UN organizations and you're going to see them in all the panels. There are few spaces where Wim are actually being able to sit at the table and make the rules. And the AI (?) So I think why is Mohanty is the only one? There's many others that are male in the other rooms. You can see them there. I think the ones that we're carving inclusion in the space are Wim. A lot of women are -- that's why there are not many women. The incentives create the opinion (?) And just give them the space at the table.

(Applause)

>> DOREEN BOGDAN-MARTIN: Thank you very much, Rebeca. Thank you for bravely take up that question. I see the question in the back of the room. If you could introduce yourself and then state your question and then Mohanty, we're going to come over to you. So please go ahead.

>> My name is Chris, I'm the head of the innovations service at UNHCR. I'm lucky enough to work with Rebeca. I was going to call out that ridiculous question with the three votes there on -- is it two votes or three votes, two votes on Mohanty being the only man on the panel and then reiterate what Rebie has said. I'm going to ask a different question. My question was around and directly towards from EY and IBM. I'm interested in conversations around how we can make the creation of AI more inclusive. I think conversations are great. I'm also interested in the private sector, the big private sector companies having the skills, the expertise, the money, and the ability to set the tone and to set the pace at the beginning of the technology and not waiting to pick up the pieces later on, not waiting for digital divides, not waiting for an AI divide.

I have one question to both of you if I may and that's, what will you do leaving this conference to make sure that your respective organizations don't create such divides and are more inclusive when it comes to the creation of AI. Over to you.

>> DOREEN BOGDAN-MARTIN: Okay. Good question. We're going to come to that in a moment. I would just ask you to keep that question in mind. Before we come to that, maybe Mohanty over to you on the question that I raised before about what can we do to fix the bias issue? We heard from Eleonore some of her thoughts about the citizen labs and getting everyone involved and the fab labs and you have your crowd AI. Would you like to share your thoughts on that and we'll come back to our private sector colleagues. Please go ahead.

>> SHARADA MOHANTY: In fact having a lot more people involved is kind of the answer to kind of reduce bias in general. And having proper representation from all of the different shared context is the answer.

But I think Saska mentioned that this technology learning is a very hard problem. Again, many people are very pessimistic if it can actually happen.

I on a personal level is very optimistic that this can actually happen. This piggybacks on the idea what we call democratization.

Do we want everyone in this room to sit down and start writing a lot of code writing AI. Or do we want people with enough skills to start and lead a large AI project. And then it's a question of the management. The management of these large set of people with different levels of expertise. That's why we go back to the same example I gave of open source software development. All these softwares are pretty complicated pieces of software which is much like modern science right now. They're managed by a small number of people and then a large number of people who are trying to learn but very efficiently coordinated together in a beautiful way to come up with a product that works. As I said, it needs a small seed of people who have skills. A lot of skills in managing all these people together so that all these efforts are focused in the right direction.

This is something which can happen and should happen over the few years with AI especially it's becoming more and more accessible. If you have a little bit of background and somebody told you can never build an AI for a problem you care about because it was too hard, he was lying. You can spend a few hours over a weekend and you can start seeing progress.

>> DOREEN BOGDAN-MARTIN: Thank you. Thanks for sharing the optimism. It's encouraging. Now back to Cathy and Saska to respond to Chris' question. Views from the private sector and what would be the one thing you would do when you leave this room today?

>> CATHY COBEY: Er well, I myself am in a unique position because I was appointed EY global trusted AI leader. There's a lot I can do when I leave this conference in things I've already been doing. I see it's really important that we show leadership in this area. I had conversations on Friday and there's a lot of support in our in our technology group to walk the talk. We're saying if they say they need an ethics advisory board we need one. We're going to be at the table with the governments. We're just having a conversation just on Thursday with the PCOB which our regulator for our audit firm as AI is used in financial reporting. What is our role in providing trust in its use? That's the number one role we can play is providing that -- instilling that trust through both the advisory work that we do with our clients and what I have seen as I've started to interface across the globe with my colleagues is that as I'm getting deck after deck of the dialogue we're having with the client -- I do appreciate it's conversation at this point but it's important to have awareness at the beginning as well -- is that deck has in it what is AI, how can it be used? What are the use cases? This is how you have to manage the risk. This is how you build trust.

I think it is really encouraging that that is part of the dialogue and -- funny, as we speak to organizations about those different services that we have, the trusted AI dialogue that we can have is the piece that they keep asking us to come back and talk to them more about. I think there is that recognition that is really important. It is something that the executives at our clients -- I'm not just talking about technologists, the banks, the defense companies, the retailers, and so I think that what is important is that we as a private

organization and also as the technologists all work to find ways to be -- to do it in a more trusted manner but also to be more inclusive to some of the ideas I talked about earlier about how we can try to -- I think we've got some really large problems but I think they can be solved quite quickly if we bring our minds to it. Usually when we decided to go to the moon, we went to the moon pretty quickly, under a decade once we started to put -- what is our moon shot that we want to put forward? I think that should be something by the end of this conversation on Thursday that we think about. I think that is one. Terms I saw in the program. What are going to be the moon shots. We need to create some focus because if we try to spread ourselves too thin, we cannot accomplish as much. Let's create some focused areas. (Trailing off).

>> ELEONORE PAUWELS: Maybe I can add a couple words. You may not realize it but trust, inclusion, and fairness and developing systems that people will believe in and use and feel that they're trustworthy is going to be essential for private companies because it's really a question of not just it's the right thing to do in values but are you going to stay in business because if people don't trust your products, they're not going to be buying your products at the end of the day. You saw it actually, I think the thing that happened with Google duplex was an interesting demonstration of that. Because the duplex was a very impressive technology demonstration. But it didn't resonate with the public because they didn't bring it in the market in a way that it implied trust. They did not explain how it's going to be used, that it's a bot. A whole bunch of things that we don't need to go into. The technology didn't win over the ethics. So the private companies ethics and building AI systems that the customers will trust is going to be a matter that will keep them in business.

What I do in my position is, for example, our large team in IBM research actually really works on all the aspects, the engineering and scientific aspects of what is it that we as engineers and scientists can do to build better and more trust with the systems? It means how do we mitigate bias? How do we mitigate biases algorithmically from data, I spoke about it. How do you wire your systems with some sort of immutable storage or instrumentation so that later on maybe even many years on, you can reproduce the decision or you can reproduce what happened in the system because you will have to do it for a purpose of law or regulation or just to show what happened for safety reasons.

We're trying to look at, hey, how do we create algorithms that are essentially explainable or how do we make black box algorithms explainable. These are fundamentally important. I think part of what private companies do you actually see more and more of that because it is going to make it or break it.

>> DOREEN BOGDAN-MARTIN: I know we're quite short on time but I wanted to come back to Eleonore and Rebeca and Mohanty for a last comment. Eleonore, we have spoken about many different dimensions of what it means to have social inclusive AI. Is there anything we left out when we talk about inclusion?

>> ELEONORE PAUWELS: Something that worries me or that keeps

me -- I would say it's really this skills gap and giving a chance for people in the future to be empowered that they can invent their own job, figure out how to harness data and AI for their own trajectory. I've met enough young people who could do it. It's actually possible. How do you create that space for that form of empowerment? And something -- so that skills gap worries me, that space for inventing, for imagining together, for a more social exclusive -- layers of society to be able to anticipate implications of the technology and how can we foster the form of foresight later on with different imaginations with different knowledge, different values. I think that's something we have not found a way to do it. It's going to be important for other technologies like genome editing. If we could figure that out and maybe have a space for citizens to be not only passive but actually own a little more of their future and be able to claim that. That would really make sense. It's much more computer service but it's a space to create. When you see the kind of jobs we might have in the future, I think that's very key. When I was thinking about those mentorship, fellowship from engineers coming from companies, that form of distribution we don't have an adequate distribution right now for the benefits that are being made to community health computation to much larger layers of society. I think that would be cool to have them visit some citizens science lab or fab labs and create a space for the future.

>> DOREEN BOGDAN-MARTIN: Okay. Thank you. Rebeca, I don't want to put you on the spot but there's an interesting question on effective inclusion. So NGOs knowing what kind of questions to ask starting with the problem they want to solve. I think if we put it in your context at UNHCR, you know what problems you want to solve versus trying to become experts in every kind of new technology. Do you want to touch on that very briefly?

>> REBECA MORENO JIMINEZ: For sure. No. Like technology for us are tools yet again. That's the reason why you don't see us talking about blockchain because we have a data protection policy like I was telling you. Blockchain has applications. They're brilliant but not applicable to political persecution or torture, victims of torture. There are certain applications, certain technologies in certain cases. I think the first -- I need to go backwards. We have many challenges that we have not -- in communications, in connectivity, our financials in the organization. And we have the ability of very well articulating them putting us at the design table, all the developers of AI, people working on creating those solutions of technology. We would love to give you our issues and I think it might be very encouraging for you to receive our feedback even for refugees themselves if you're interested in solving those issues.

I understand that a lot of it is corporate knowledge or -- try to be a bit more transparent as well. I talked about the representatives and bias. If you disclose your (?) How would you build a certain process which is what we usually -- you need to be very transparent, I'm assuming this and assuming this. The bias part, if possible, disclose the data if not partial data whatever you mask the data for but if you could

be fostering open data for us to be working on it and also for us we're working on having open data for you guys to work on our datasets.

Finally, I think beyond open data if you're able sometimes you can discuss some of the rules you use on black boxes on AI assumptions or minimum growth that would be useful for us when we're training the machine to know what it's behind like why are you matching this word with this word? Otherwise we keep going for open source to build our own solutions because we cannot find a specific (trailing off).

>> DOREEN BOGDAN-MARTIN: Thank you. Mohanty, last point for you. How do we know when a prediction is biased? And when can we trust it if you can very briefly comment on that?

>> SHARADA MOHANTY: That's a much more complicated problem. In fact, we are struggling with the same question in academy in general how do we have predictable models. I think I mentioned it in one of our slides. If I gave you a prediction on an MRI that this patient has breast cancer and I delegate the blame to the model that's not something that will actually fly.

So before we can actually trust these models, we need to have these processes in place where if we are investing a lot of our time and effort and direction in the name of academy progress and we suddenly want to take this academy progress in a product there should be processes in place that basically answer all of these questions about ininterpretability and trust which is accountable by itself. Without that, it's simply not safe to begin with to be actually used in practice. And if we are impatient and just because we see some good results in academy and we want to push these results into industry and into the real world, then this impatience might actually cost us a lot more in the long term by bringing down the trust, the general population has in these systems.

>> DOREEN BOGDAN-MARTIN: Well done. So ladies and gentlemen, please just me in congratulating our amazing panel. We are unfortunately out of time. So please join me with a round of applause for our panel.

(Applause)

>> DOREEN BOGDAN-MARTIN: This has been an extremely rich discussion on a very complex topic, one that is, I would say, a prerequisite to having AI for good for all. It's something we really need to tackle and build in from the design stage. I think lots of points to take away from the challenges around the skill gap that I think you all brought up, about the challenges around bias and bias being everywhere. And thank you, Mohanty, for explaining indeed how very complicated biases are. They are a reflection of the society that we live in today. The need to empower everyone to be engaged, as I mentioned, the need to be there at the design stage at the beginning, the need to be favoring diversity, the importance of transparency, accountability. And also the point about understanding the beneficiaries about understanding the local needs I think is an important take away as well. Coming up with new business models new partnership models some of the challenges around funding and the need

for collective spaces. I think that's a good one via fab labs, citizen labs or crowd AI and the importance of trust which I think was underscored by many of you at the end. And of course walking the talk that I hope we can all do as we leave this room. With that I would like you to find your way back to the plenary room. If you found your way here, I assume you won't have any problems getting back there to the Popov Room at 5:30. We will have a special guest, the director general of the UN in Geneva, Mr. Michael Moller and he will be addressing us with his key note address. Thank you very much.

(Applause).