

Announcer:Ladies and Gentleman, please welcome our next panel for a discussion on technology the digital economy, and how it's changing global business. Our moderator Dean Garfield, President and CEO Information Technology Industry Council. He's joined by speakers Cathy Novelli, Undersecretary of State for Economic Growth Energy and the Environment, and Senior Coordinator for International Information Technology Diplomacy US Department of State. Vinton Cerf, Vice President and Chief Internet Evangelist Google. Jonathan Woodsle, director of the Mackenzie Global Institute, Mackenzie and Company Shanghai.

Dean:Should I went for the clock?

Cathy:No.

Dean:Good morning, it is impossible for us to see anything in the audience, and so I'll just assume there are people there, and I'll get started, because the clock is rolling. I noticed that there was an introduction done already, so I'll just jump right into the conversation, particularly because our time is short, and I'll start with Undersecretary Novelli. We know that the internet and broadband is a global good, and yet 60% of the world's population don't have access to it. It'd be good to start by talking about your thoughts on what we can do about that, and what the state department in particular is doing.

Cathy:Well thanks Dean. It is a privilege to be here with these wonderful, with you and Vince and everybody. So exactly, it's a global good and what's really striking to me, if you think about what we want to do in terms of development, and you think about what the world bank has determined after looking at the economic analysis, and what they determined is that for every 10% increase in connectivity in a developing country, there is a 1 to 2% rise in GDP, and if you think about the opportunities that that presents for everybody, from education to healthcare, access to markets, to access to other scientists, it's really remarkable.

That's why we have actually started an initiative called Global Connect. The idea behind it is that we want to catalyze getting more people online, and we have a goal of getting 1.5 billion people online by 2020, and we understand that it's not just the US government. It is actually a multi-stake holder approach here that we need to bring together, governments, not just communication ministers, but finance ministers as well who have the funding. We need to bring together multilateral development banks, who also fund infrastructure, and in the past haven't really looked at the internet as fundamental infrastructure, and we need to bring together the private sector, who is doing all the innovation in this area, and looking at various ways to connect those who are difficult to connect, and we of course also need the MGO community.

So this is literally an all of the above approach, and we are aiming to be a catalyst. We are hosting a big event on this next week, which I know you'll be there, and with Jim Kim, Secretary Carey, and Jim Kim are co hosting it, to really try and move all this forward. We launched this whole concept in this fall at the UN General Assembly, but what we're looking at is how do we create opportunity for those who are going to be connected? How to we create opportunity for our businesses to be involved in all of this and the economic activity of this, and how do we make sure of that as these connectivity increases, that we are doing it with the sound policy basis? So that we have a healthy internet on a going forward basis.

Dean:Two questions, one about the healthy internet and principles for guiding us going forward for Vin, but let me first start, Jonathan by asking you, given your role at Mackenzie, and the fact that you're based in Shanghai, Cathy, Ambassador Novelli, Undersecretary Novelli, talked a little bit about opportunity. What are you seeing as far as opportunity for economic growth as a result of what you're seeing on the development of the internet?

Jonathan:Well thank you, and it's a really interesting time. We've frankly after the recession we sort of felt like all of the global trade, finance service, took a bit of a hit. So we've seen stabilization off of a peak on 2007 down in terms of the physical flows of maybe 10 or 15% off of where we were at the peak before that. Then on the other hand we've seen a 45 times increase in the rate of cross-border bandwidth and data flow since 2005. So what's going on we think is a change in the character of what we mean by globalization.

So with globalization, it isn't anymore about just purely physical goods and services, it's digital globalization. It's people using the power of technology to create impacts, to create revenues, to create profits globally. You see this in all sorts of ways. Obviously, you see it in the countries and the regions and more turned on if you will, more switched on.

The most connected place in the world is Singapore in terms of total flows, and that is essentially their strategy, to be connected, and they are connected physically, they're connected through people, they're connected through finance, they're connected through technology, and this creates tremendous opportunity for them. You don't have to be a hub to do that, in fact probably the biggest single economic development impact is on the individual, and the rise of the so-called, the micro-multinational.

For example, if you go and you Google 20 kilowatt motors in Bangkok and you just put that out there, what will you find? Well you'll find one sponsored result from Seamen which takes up the top half of the advertising bracket, and then you will find 15 pages of no-name individual motor manufacturers selling into the Thai market through Alibaba or Jdcom or some other platform, which has created this tremendous globalization for people who literally don't speak the language. So its pole vaulted language, its pole vaulted finance, its pole vaulted regulation entirely, to create global companies like that. So that's the impact of the technology, and that's what we mean by digital globalization.

Dean:Thanks Jonathan. Vinton you were there at the start. It seems like you want to build on that, so just go ahead.

Vinton:Yeah, I would just love this. First thing, everyone in this room knows that the flow of money lubricates business. What you also should've just learned if you didn't know it already, is that the flow of information lubricates business, and internet is one of the means by which information flow can be facilitated. So the first question is what to do about getting more internet infrastructure in place. As Google's Chief Internet Evangelist, that's my primary objective. I want everybody online and I'd like it to be at highest speeds possible, lowest delays and everything else. One thing I think is important for everyone in this room to recognize is that this big tent called internet supports multiple business models. There are some parts of internet that are run as not for profits, some are partly run by government, some are private sector, some

of it's in your own backyard, or in your living room, or down in the basement. So multiple business models are possible here, not just the standard for profit type of thing.

The second question though is what are the conditions for successful infrastructure development and evolution, and there are a number of them that are not technical in nature. One of them is having well educated workforce that knows how to build and operate this stuff, and how to use it. The second one has to do with financing, which is what you care about, and that's making sure that there is capital available for people to build the infrastructure and the flow of funding in order to operate. A third thing is surprisingly enough electrical power. The internet doesn't work without it, and if you go to places where electrical power is not widely available you can see that internet has some troubles. Although people are out there with their bicycles, recharging batter, and running in burgers, and making internet equipment run in spite of all that, and finally, just access to the technology itself. Having access to facilities to build these things.

In the end what will be important, and we'll build on Cathy's point about GDP growth is open access to the internet, so that you can build without having to get permission from everyone under the sun, build a new product, build a new service. People should have the freedom to invent. They also should have the freedom to fail and this is one of the problems we see in some cultures where failure leaves you with a mark on your forehead, and no one will ever give you any money anymore to do anything. In Silicone Valley, failure is a mark of experience, unless you fail all the time, that's a different problem, but for the most part we treat experience and failure as an important asset, and finally in terms of reinforcing, which you were saying about the businesses, small companies through the internet get access to global markets potentially, if they're interested in trying to satisfy them, and so here we have this wonderful infrastructure that's capable of making the world a place to do business in. No local economy can equal the global economy, and if you can attack the global economy in addition to your domestic economy, you have a much bigger opportunity for success. So I'll stop there, sorry to go on.

Dean:Cathy, building on that. You worked on this a USD issues a USTR, and then at Apple Inc., and now the state department. What gives you cause for concern, and where do you see opportunity, change that makes you feel good about where we're headed?

Cathy:Well one of the things I was thinking building on what Vin said is everywhere I travel which is extensive, I always go to incubators, because I just want to meet who's inventing things around the world, and one of the things that's absolutely key is that folks are inventing things for their own markets. So yes they have access to global markets, but each market has its own unique characteristics, its own needs, and so the internet is really kind of been a catalyst to have more people think creatively about how they can fulfill those market needs. It gives them another tool, and they can globalize that as well, but it just is fascinating to me to see how people start, for example if you think about Kenya where they had a problem with banking, and people not having access to banking, so they invented mobile banking, and the concept of it, and drove it forward, and now everybody uses that. So we all get to learn from these innovations that arise from different places, so I think there's an incredible opportunity there for local folks. There's also an incredible opportunity for our own companies to hook onto that. To

invests in that. To have access to more markets themselves, with what they have to offer, to partner.

I think there's incredible opportunities. I think the concerns that I see really come mostly from governments who haven't been prioritizing this, and even talking to some of the multilateral development bases, not that they're opposed to the internet, but part of the reason why we started Global Connect is because it was very clear to me that, in their own mind, they didn't think about the internet as basic infrastructure, so they were busy allocating funds for how they were going to create this basic infrastructure in countries and to my mind, we are in the 21st centuries, and this is the road in the 21st century, and if you don't start putting this into your infrastructure, you're going to keep falling farther, and farther, and farther behind, and that is a serious concern that I have about this.

Going beyond that, there are some countries who are also concerned about what is said over the internet, and that's obviously something we have to deal with. The question of censorship has been an age old question, so it's not new, it's just on a bigger scale.

Dean: Different medium.

Cathy: Yeah, but I think if you go back to the economic side, there's also questions about how when I suddenly want to have an internet that is healthy, one of the important things is that you have to have competition, and competition drives excellence, and a lot of folks they start up something in the country, and we're like okay this is only going to be one supplier, we're going to keep it all close, and that is going to choke off progress. So we're trying to get folks to understand that competition is your friend and not your enemy as well.

Dean: Good point. Jonathan, part of your job is giving advice to governments and businesses. Give some advice to the folks in the room. Particularly advice that you find people often ignore that they shouldn't.

Jonathan: That's fun. I usually don't get to be the voice of doom, because I think it's true that there's lots of opportunity, but most of that is first of all going to be captured by the consumer, and then secondly by attackers. So the new entrance, new business models, the average lifespan of a company is declining dramatically. I think you all know this, but you should be prepared for more, many value changes, many supply changes are intensely local which will get dislocated very quickly.

Construction comes to mind, and how one thinks about where the next generation of engineering and construction revenues are coming from. Globally merging markets are over 50% of trade, and they're growing. South-South trade is the fastest growing portion of that, so if you don't have the capability to engage in the global market, you go to the global market or the global comes to you. It's a lot better to have the capabilities to do that. While the world isn't flat really, there are places which are more connected and places that are less, and I think that's a big challenge for society. Corporations should be a lot more flat, and that's sort of accelerating your response time your capacity to get information, turn that into a product, iterate quickly.

I was in a meeting yesterday, and it was nice, it was optimistic. The people had used the word 50 years old, and said and still young in the same sentence. That made me feel very good. It may be worry for the company too, the capacity to just not only have young people in your organization, but to actually listen to them, and to give them roles and

responsibilities that are commensurate with their capabilities, that's going to differentiate a lot of the winners, and for governments, as was said, there's a tremendous capacity challenge to put that in place. There's also a human capital challenge, and there's a dislocation challenge. I was in Australia, I cannot tell you how many conversations I had about taxi drivers and medallions, and who would think that a piece of software from Silicone Valley would up the pension plans of Australians. If you think that is something wait til autonomous vehicles takes a lot of people out of the driving profession in North America, dislocation is just getting started, and this has a real social government implication.

Cathy:Can I add one thing to that.

Dean:Of course.

Cathy:It's very interesting I totally agree with you. I found a sign of hope in Chicago of all places. I was there at their incubator 1871, and because there's so much manufacturing there, they have focused on trying to bring the manufactures together with what they call coding ninjas and other sort of technology folks, and sort of saying okay you're doing this, but it's going to change, so how do you take the best minds of the connective world and apply it to your situation? It is fascinating to see that there are some companies recognize that they have to revolve or else they're going to become dinosaurs. So hopefully there's a way forward for that.

Dean:Vin, in the green room we were talking about the fact that you were just in Cuba, and you were sharing some of the entrepreneurial creativity you say there. I think it would be interesting for the audience to listen to that.

Vinton:I would love to respond to that. May I say a little bit though about what keeps me awake at night which is relatively to-

Dean:My job is just to get you to talk so talk about whatever you want.

Vinton:Thank you for that. Pragmatic! So two things first of all keep in mind that everyone of you has a Mobile phone or two. Probably most of them are smart phones. Guess what? Those were invented at Apple less than 10 years ago. So, what you have for right now is this massive raft of increasing productivity thanks to the investment in mobile phones technology. The next wave is coming it's called the, "Internet of Things," and that will outweigh the mobile phones in terms of numbers by factors of 10 to 100. You should be worried about this, I know I am. the headline I'm worried about is 100,000 refrigerators attack Bank of America. And you laugh but in fact the computers that are running those refrigerators are powerful enough where if they get loaded up with malware, they can do a lot of damage. So we should be worried about that and so the triumvirate of things to keep me awake are security, safety, and privacy in the space of Internet and Internet of Things.

Dean:Can I relate to that actually? You were there for the founding of the Internet.

Vinton:This is going to be the what were you thinking question?

Dean:Yeah exactly, but not only what were you thinking? What do we do about it to take advantage of the benefits, but to limit some of the challenges that we know now?

Vinton:So the fact is, that the technology that helps security Internet was not available when we were doing the design, in 1973 the public key crypto was not even suggested until 1976, and the RSA algorithms didn't emerge until 78 or 79. They weren't available when I was freezing the

designs so that I could get something built, to see if it would work, but we have capabilities today that can be retrofitted and are being retrofitted into the system and Google for example everything we run is HTTPS, the secure encrypted version of the hypertext transport protocol, which is what runs the world wide web. We're doing strong two factor authentication for our people and for anyone else that wants it. Again to protect you from crappy username and password combinations.

So there are a bunch of things that we can do, are doing, and still need to do in order to make this more secure and safe system. The scary part about the Internet of things is that those devices may have software in them that has bugs. We don't know how to write software that doesn't have bugs. So first we have to be prepared to update the software in a secure way, and secondly we have to be prepared for the consequences that a bug causes a problem and with the Internet of Things controlling physical activity, even ventilation, air-conditioning, security we really have headaches on our hands. I'm not trying to scare you away from all of this, I'm just trying to tell you that the technical community knows this, and is really working hard on it.

Dean:I assume that's not the buzzer for us?

Vinton:You never know.

Dean:Speaking of the Internet of Things, I don't want to get us too deep into a conversation about encryption. I would like that but we don't have enough time for it. I'm curious Jonathan, and then I'm going to come to you Cathy, how companies are thinking about the Internet of Things, and whether they are adequately preparing and what they should be doing both companies and governments. I'm curious, Cathy, your perspective of that. What you're doing, and what else we should be thinking about? ...

Jonathan.

Jonathan:I totally agree of course with what Vin said. This is going to be a much bigger wave of innovations, and just as we build things and discover they're actually more useful for everything else. So we built this wireless infrastructure for voice, and now it's data. This revolution is now connecting everything. It's not just the company of course.

We see that the used cases evolving fastest in places where you have, first of all, obviously physical capacity, but you also have to have application and human capital. As importantly you have to have regulations which allow for experimentation. If you're talking about a smart city, if people aren't willing to share public data, and not in a secure way, you're not going to have any used cases, and then this dislocation question, because you're actually asking people not just to have data, but to change something. They have to change how they dispatch the police cars, or how the building inspector does the job, and so these things are actually union in some cases, issues. So there's a whole conversation about how do we rethink what we mean by work. We think that up to 40% of daily jobs could be automated, not every job but 40% ... Not 100% of the job will be automated, but 40% of every job will actually be automated. So this is going to affect companies at a very individual level, and change all the processes as a result.

So, I think it's a IOT we're going to see again, a tremendous wave of dislocation in companies I think that most of the value will go to the consumer, the values biggest in the consumer economy, the things that make the difference are value of time, value of life. So anything that saves people from getting killed, notably traffic for fatalities or

protects them from the environmental hazards: water, air, these will be the first things up to go, and who's going to make the money? Well, usually yet again it's the attacker the person comes in and says I can do things in a different way, I don't feel constrained a lot by my, "legacy assets." On the other hand I should certainly share the optimism that there is no defacto rule, which says an incumbent can't change their stripes. There are many good examples there too, but we will see dislocation, and we will have a tremendous need therefore to reinvest in our people, in our human capital.

I just want to come back to that we have this educational model which says that 80% of our educational expenditures are between the ages of 18 and 25 it's like why? Why would that be the case? When we know that the human brain can learn as much between the ages of 40 and 60 as between 20 and 40. We decided not to learn anymore. I think that every company should have that as their number one priority is to figure out how to fix the talent model, because that's all you got, there's nothing else.

Dean:Cathy do you have a sense of whether your thoughts on how well governments are preparing for this eventuality?

Cathy:I think there's two things. I would say one, I totally agree that we need to think about how we have a flexible work force, and an educated flexible work force when some things are no longer relevant, and new things come in. We can adapt to that, and if we don't I'll just have chaos and people say I'm out of a job and there's nothing else I can do, and I think that governments have to be thinking about that. When I visited Detroit last week, the mayor of Detroit just announced that every high school student who can get into a community college will be able to go for free. Which I thought was exactly the kind of thinking that we need to be doing in a flexible way, the other thing though is there is a tendency, I think, of governments to feel they have to fix everything and I think-

Dean:Not in this administration of course.

Cathy:I was thinking about overseas-

Dean:That's sarcasm, if you missed it, but go ahead.

Cathy:It's hard to sometimes leave your hands off things and see how things develop, and especially for innovations and for technology. You have to tolerate a certain amount of chaos in order to get progress, and that doesn't mean that the government never needs to intervene, of course it does, but you kind of have to let things play out a little bit so you can figure out how you intervene without completely choking off the innovation, and finding that line is a fine line, and that is something that we see around the world even in the case of taxicab drivers that somebody invented, a much more consumer friendly way to do things, and so how does that all play itself out? I think that is going to be the biggest challenge that governments faces. How do you protect the health, and faith, and welfare of your people but not have then be stuck in cement and stasis?

Vinton:This internet story is a good example of that. The government started the project, the defense [inaudible 00:26:05] agency had full control of that, I ran the program for 6 years, and wrote the checks, and made a lot of the decisions, but in the end, the government kept stepping further and further away from control, and [inaudible 00:26:17] is a wonderful example of that. So finally, the latest thing is the GOC and NTIA said they want to severe their oversight of eye candy, internet corporation for assigned names and numbers. I think the US government did

a spectacular job over 4 decades of nurturing this thing and not messing around with it very much. Congress was very cooperative in that regard. We're going to run out of time in a minute.

Dean: Yeah so we've got a minute and 35 seconds. So each of you take 30 seconds and answer the question that I wasn't smart enough to ask. We'll just go down the line.

Vinton: If you want to go away with one word, that I would urge you to think about, it's insensitive. If you want a different outcome, understand what the incentives are that are driving which you don't like, and find a way to change those incentives. Otherwise forget it.

Dean: Wow. 20 seconds, well done.

Cathy: I would say, things have to be economically sustainable in development, in conservation, in everything, we have to look at what's the economic model, that's going to sustain the internet, and all of the things that flow from in it. It's not just about charity.

Dean: Good.

Jonathan: 8 trillion dollars, that's the value of data flows to the global economy. Go get it.

Dean: On that note, thank you very much, thank you for being a great audience.