Catherine...?

CATHERINE CARUANA-McMANUS: Catherine Caruana-McManus.

JULIE McCROSSIN: Catherine Caruana-McManus is the director of Giant Ideas for Smart Cities, and also the director of Meshed, and she's launched a Facebook community called Smart Cities IoT, which I now know is the Internet of Things. She's been recognised by the Prime Minister's Knowledge Nation focus as a leading thinker. Please make her welcome.

(APPLAUSE)

CATHERINE CARUANA-McMANUS: Excellent. Now we've got my name right. When I was a child, I would say, "Think of marijuana, but say it with a 'C'." I am going to hopefully demystify this concept of the Internet of Things. Because we are really in a space of time where I'm looking at those predictions, and actually, in 1995, when we launched White Pages on the internet, there were only 247 websites globally. And we were ranked, I think, something like 54th. It just goes to show you that, in a blink of an eye, we've got a situation - since 1995 - of how things change so quickly. I've got a little clicker here, and I'm going to whip through this pretty quickly, then hopefully we'll get some questions. When we think about connected cities, what's happening at the moment? Even yesterday, there was an amazing announcement of an Australian company that's brought technology to Australia, and they're going to be testing in New Zealand fully autonomous vehicles. We hear this thing about connected cities and autonomous vehicles - we're all going to be living in this Jetsons world. The interesting thing about what we see here is that - that's largely been driven by big business. The industry, the car industry, looking at ways in which they can make driving more interesting for the future, because we're seeing, actually, mass migration of young people away from cars. So therefore, what does this mean for a connected city? I know for a fact, actually, that a little while ago, there were some focus groups run with elderly people in Melbourne. They actually looked forward to the era of a connected vehicle, because it might actually give them the opportunity to travel outside of their homes and visit family as they get older and not have to do that blasted driving test. So there's good and bad around this, isn't there? We're really not quite sure what that means.

If we thought that wi-fi converged with 3G and smart apps was game-changing, well, there's something else that's on the horizon which is happening right now. I've deliberately put Trip view. Has anybody used it? I do. My phone is full of these different cities I go to, I have an Opal card and Oyster card. We are seeing the internet of everything. I'm not kidding. A little while ago I was contacted by a researcher, they're trying to track platypuses and they are having trouble with this, so they are looking at literally putting a little device on a platypus which will send data potentially through a radio connectivity network so they can understand what's happening with this little platypus. If you think it's not happening, think again because, actually, everything potentially could be connected to the internet so that people can get information about what's happening with that thing.

You don't need to listen to me, very large advisory companies that have a bit of impact in this world are also predicting that IoT will be one of the - the Internet of Things of things which will be one of the most disruptive technologies over the next three years. They are certainly putting a lot of information around this. It is a great report, if you have a look at that, just released in August.

What does the Internet of Things actually mean to the average Australian? I know that when I'm actually out in regions, it means a lot. In fact, Frank is here from the IoT Alliance, I think he will be speaking with us later today, he will be get into the nitty gritty of what's happening on a national level around the Internet of Things but it is a huge opportunity for Australia and we took the information from and we looked at industries that can be accelerated in terms of productivity. It is a $116 billion opportunity. Even if you don't believe those numbers, the reality is that, in many regions, they still are struggling with connection to networks and we are starting to see some really transformational technologies which are used in things such as existing radio spectrum to transmit data. That certainly has a great, I think, impact for unlocking the economy potential of regions, not just radio frequency networks but also other networks, satellite and what not.

What does it look like? This is what the Internet of Things looks like. I can guarantee you that every single local council that you live in is looking at this right now. They're looking at ways in which they can reduce cost around their operations, such as whether bins are filled or not, whether a parking space - although I hate talking about parking because we all know councils are into revenue with parking, right? I don't think it's got a lot to do with utilisation but the reality is there is a lot of other ways that the Internet of Things can really improve services to people, to citizens. We know that water authorities are looking at monitoring water quality because we have an interesting system in Australia where what we do, as the rain falls into a dam, it's transported a long way and it's put through your tap. Of course, it uses a lot of energy to move all of that water. In places like Port Hedland and the mining towns, they have to re-treat the water because, by the time it's travelled that distance, it needs to be re-treated. This is where the Internet of Things, being able to understand what's happening with water, can be very valuable.

Gold Coast are looking at this. They have deployed a municipal-wide network connecting a range of things. The koala is not just there for cuteness, they are looking at the way the Internet of Things can help koalas. They have been putting out foot-hold traps on animals to check whether or not they are at risk from being eaten, so to speak, and hurt.

Ipswich is also a region that's embracing this. They've deployed a public access free-to-use internet network. What does that mean? It means anybody within vicinity of this network can connect their battery-operated device and get the information about what they're using. So I just want to pick up on a couple of points of the last speaker. We talk about the have and the have notes and ubiquitous connection. The reality is there are models out there that we can embrace in this whole new paradigm around the Internet of Things which can actually enable people to get data, because ultimately, at the end of the day, that's what's important to people. So we have things such as Internet of Things networks that are currently being deployed globally. Some of you may have heard of the Things Network. The other thing, too, that's happening is that we have these small hardware development keys, things like raspberry pies and the power of being able to look at things like Smart citizen kits. This little device, you can buy it, it will only work on frequencies in Europe but it is actually a GPS tracker, temperature and humidity, it is a smart citizen kit. People are getting interested about going around their city and understanding more about it and getting this sort of data through an app. This is the point at which the data is transferred.

I suppose what I'm saying is that there is this opportunity where we can put the Internet of Things into the hands of the community and many of you will have been invited to things like hack-a-thons. They're fantastic. All the telcos are getting involved with this because where do we know the next Smart City application is going to come from? It is probably going to come from one of these hack-a-thons.

Just in closing, I wanted to share with you something that's right live now that's happening within this actual precinct. It's called the Tulip Network. What it's doing is we have put up a free-to-air network and, essentially, different people, and even we've got the city interested and insurance companies and others wanting to sponsor sensors where we are putting up sensors that are tracking environmental data and we are sharing that information via basically an open portal. But the point here is that we really don't necessarily need to be bounded by traditional thinking about how we use networks because I love Bill Gates' vision and I would like to see that, in connected cities, in communities, we can actually make that vision happen but it only happens when we collaborate. So what I think's really very powerful and exciting is that we do have this opportunity and it's amazing the number of great ideas that are coming out of the university industry, community sector when they're working together. I think it's really exciting to see. I think the upside of Smart Cities because, whilst Australia traditionally has been behind in Smart Cities, we could very well see ourselves accelerating as we look to the Internet of Things and the way we can actually make it relevant to every person. So thank you.

(APPLAUSE)

JULIE McCROSSIN: Thank you so much for that presentation. We have a second speaker and then we'll open up to questions and comments. The second speaker is Nadeen Jayasundara, principal of Internet of Things and connected home with ibb Consulting. Nadeen is 20 years' experience in infrastructure construction, service and the finance sectors. She is a leading thinker and speaker in relation to Australia's digital economy. Please welcome Nadeen.

(APPLAUSE)

NADEEN JAYASUNDARA: Nadeen, the boy. It is an honour to be speaking on smart communities. I might have misunderstood the communication, I thought I finally got accepted on to Shark Tank. If I can practise, give me a few minutes, tell me if I'm going over that. This is it. Uber grannies, I'm looking for investors here, basically I thought when you were talking about smart communities, smart ways for me to take advantage of communities to make a lot of money while using infrastructure and not spending too much.

(LAUGHTER)

>> Hopefully this works. I'm trying to pitch it. It is for cheap babysitting. Got a young family, couple of monsters - I mean beautiful future leaders of our society! If I can get probably 24 by 6 days babysitting service, maybe a bit of cleaning, that would be great for me. I was thinking how can I solve that problem? It's not fair all my Italian friends have grandparents on tap. It's not my problem I'm from overseas. I should be able to use them when I'm not using them. You have heard of subscription as a service, this is conscription as a service. I think I have a good model here. Medicare is easy to hack. I have a Russian team on to that. UTS intern program as well. Profiling monitoring data so I can get into this. It is going to be an opt-out model, fine print, I will definitely get the vision-impaired segment. Chips when I go to the doctors, so they won't be told because there will be a Medicare rebate scheme with a doctor. We'll be able to control you anyway if you try to rebel. Basically wearables, monitoring, cameras, we can watch you 24/7 so you can't really get out of it. If they are struggling or it's not working out, we will replace them with robots. I will replace most of my parental service with robots as well. That's my future vision. I don't know why I haven't got any investment yet!

(LAUGHTER)

NADEEN JAYASUNDARA: A few subliminal messages. What we are really here to talk about, with technology changing, what it means for communities. There is a great quote - I was with dialup, everyone was wondering what we were going to do with broadband, we will get take-up. 256, yeah that's enough. 512 K, that's plenty. What will we do with that? There is a great quote where I think we overestimate in short-term and under-estimate in the long-term. If you look back, we couldn't live without broadband and speeds we have today. We keep saying the speeds aren't enough or the quality isn't enough so there is always more. It is showing as you put the technology out there, now we are seeing with IoT that it eventually gets consumed but in different ways we didn't even imagine. A greater believer in that as well. At the end of the day, you have to solve it for communities and I've got it up there what does it mean for them? Outside our telco industry community, UTS students, most people won't know what most of the words mean. What does IoT mean? Three slightly different answers of varying lengths. Even within the industry we have got slightly different versions but I still see a lot of promise. You have seen Catherine's presentation, I believe in that but it can evolve in different ways but there is great applications especially for Australians into transport, agriculture and into our cities and communities.

We thought with a lot of uncertainty and there is a lot of hype and there is a lot of vender technology push, we thought let's step back and do some research around it because when we looked at it, there is a lack of that in Australia. There is a big opportunity. We have done a bit of a deep dive but more can be done by academic Institutes, industries. We are hoping to do more on the back of qualitative surveys over six months, many people in this room and key people who will shape the industry, so you can see them. Government is not there because we think it's kind of for the industry and the experts to shape that and give the recommendations to government. You want a range of views that's quite robust, you are thinking of the consumer. Because everyone will have their own bias so we tried to get to a different cross-section of groups to get the overall arching themes coming out of that.

What's the major benefits, the drivers and barriers? It was around IoT because IoT is underpinning a lot of the new solutions, as you saw in the previous presentation. But try to get behind what it means for citizens and the community because that's what I see as the difference between smart cities and smart communities. Start semi-s is very much the infrastructure, the buildings, the systems, whether it is education or health. To me, community is about the people, the citizens, that's what brings the city to life. I think they are quite different even though they get used interchangeably quite a bit.

That's the research we did. Looking to build on that with some more quantitative demand modelling in the next stage so that'll be more next year.

Insights here again. Based on what's coming out of the research but also we have experience in the US doing a lot of smart city and council kind of consulting work is that you have got the cities as well as the communities or the citizens because they are quite different but, again, they've got to come together somehow. If you look at the cities, there is no perfect segment, logically it starts with the size. Obviously you've got big cities and very applicable here, Sydney, Melbourne, dense population and causing a whole bunch of affordability issues, transport issues and, you know, you've got a lot of ageing infrastructure as well so how can you solve a lot of those problems? I think with IoT it is solving a lot of existing problems with new advances in technology. Then you've got more like a Gold Coast where you have now emerging sprawl, younger population and, really, you are already starting to see a lot of traffic congestion issues as well. Then smaller towns and regional towns or communities. There you've got population and knowledge loss, trying to compete for resources. You also have - even with the councils, a lot of limited expertise and funds or budgets so, you know, they need solutions that are quite simple but can really improve their efficiency or how they run their local area or how they engage with the local community. But, you know, again a great application around smart agriculture and innovation being driven by the community in regional areas through IoT.

The other side, I will come to the research around the key consumer segments, the Millennials, no brainer, big on tech, socially connected, multiple devices, open to using lots of data. Everything I kind of call lazy as a service. Which is me as well so I don't mind saying it, even though I'm out of the Millennial age bracket. Not necessarily owning a car, everything is rented and making life easier at the end of the day. It's also got that cool and latest technology factor.

That opens up to a lot of ride-sharing transport which is taking off already today but they are highly connected and there's a huge tsunami of data, that opens up to advertising and other areas as well. Interesting one that's coming through was around ageing and disability. A lot of people here very well informed on that community. A lot of application here. I always wondered whether people... There is a lot of application benefit around early adoption. That might be limited or driven by industry and health organisations but obviously you can see the great benefit around health monitoring, assistance with chronic diseases and management around that but even transport and mobility as well. You see great applications around autonomous vehicles and proving them to remain connected in the community as well. We will go a little bit more into that.

Also families. Obviously just from moving into new homes, a lot of homes will be built with this technology around IoT, energy management, entertainment, security for the house, for their family and it's also going to be integrated. It is going to become the new lifestyle. We are starting to see that with greenfilled states and property developers how that differentiate around that. Look at the lifestyles, very much around the car, in between work, the home and shops, so it's a great opportunity to integrate that.

This is a bit of an example as well of some of the learnings, just to touch on that. Into the age and disability community example, again, hopefully I have tried to avoid technology - trying to understand the lifestyle before we come back to the solution, understand the lifestyle, the needs, the drivers, what do they want to do in daily life and enjoy but the reality is there is some challenges as well. How can we meet their needs to be connected, to have a great life and still be very active but also the reality around some of the challenges whether physical, mental or mobility. That's some of the examples out of the research.

If I can finish on here, success is going to be from both industry and the community and also community and organisations that keep the industry in check. When we talked about value stack, at the end of the day, it is how do they make money? A lot of them are different playing parts like Telstra but you have to have bounds or principles around here. That's what you see around the outside, acting from ACCAN research people and IoT so I wanted to bring those principles back here and to show how that has to be at the centre of all this thinking both for industry and groups and conferences like this. Think about serviceability, security, affordability, accessibility, these things need to interoperate and work together and at the end of the day protect the consumer. I'm all about innovation and not trying to hold things too back but you have to have some principles and some protection around the consumer because, otherwise, who else will? That's it. Thank you.

(APPLAUSE)

JULIE McCROSSIN: Ladies and gentlemen, I will open it up now for questions or comments. I guess, again, this microphone will be on, you can share it, the focus, in a way, I think Nadeen put it very well, what does this mean for citizens and the communities? We are looking at, as it were, both the benefits and potential challenges and what we can do about it. Any questions or comments, thank you? I will come to you, Sir, then to you. Do you mind if I wiggle through? Thanks a lot.

>> My name is Ben, I'm from Able Australia, we provide support to people living with deaf-blindness. I am an Auslan interpreter. A huge applause for the interpreters working today. They are doing a fantastic job.

(APPLAUSE)

>> Something for everybody in the sector to bear in mind when we are talking about these, what I guess are starting to become pervasive but sky-in-the-pie technology but the importance of language because the people in the need of these technologies are people dealing with disadvantage. We have seen the consultation process within industry might go to peak bodies, representative bodies. It does not deal with the person on the ground who is using the technology. Often times when the person is in a position to try and use it, not be able to use it, then voice their concerns about why it is not accessible to them, the horse has bolted and the changes can't be made so appealing from one, I guess, marginalised community to the community, please, please, try as much as possible to get these devices into the hands of people who will physically be using them every day.

JULIE McCROSSIN: Thank you. I might take that as a comment and whiz over to the next person.

>> Hi. My name is Phillip. I'm pretty much interested in IoTs and the robotics. I guess my question is you mentioned IoT is something that will connect the community so it will provide them certain connections which means my question is more geared in terms of policy that's in place to ensure that certain rules can be put into this technology. One classic example is a 3D printer. It can be used for many other things but if you wanted to connect, people can upload design and download it but what kind of rules can you put to ensure the 3D print out will not be used for something nefarious? The second question resolves around technology. Some of the manufacturers and suppliers are looking at using drones to supply goods and services to their customers. There is a potential of breach in terms of privacy and trespassing and all those things.

The third one which you mention is intelligent cars, cars that can drive by itself. In this way, most cases this will be based on AI, either adapted process or neuro technology and this will be based using certain rules that the programmer has to put in the system. What kind of policies can you put in place to ensure that this particular device has a certain level of accountability? For example, for a car, if the designer considered the importance of the passenger over the pedestrian and this won't get involved in an accident because the car decided to preserve the passenger, what kind of rules can you have to ensure that the pedestrian has that same right?

>>

JULIE McCROSSIN: Well, three challenging examples. I guess it's struggling with this benefit protection. Do you want to go first?

CATHERINE CARUANA-McMANUS: Anybody who has been involved in the transport industry would appreciate and understand there is a thing called standards. For example, even our traffic lights, they meet a standard. It takes many years and many people to actually agree on a standard. So I can certainly guarantee you - in fact, I've noticed on the banner you have ACMA, they are actually looking into the use of spectrum to support connected vehicles. All of the state departments have working groups looking at the way in which the industry will enable connected vehicles. There are so many things in your question, I can't answer all of them but you have raised an important. As an industry, this is me wearing a hat with IoT AA and other universities, having that dialogue with various stakeholders is absolutely critical. For example, East Perth - are you familiar with the bus they've got going in East Perth? You can register and go on a trip with the East Perth yellow bus. Why are they doing that? So they can understand exactly some of the parameters that you've raised. All I can say is you've raised some really important points -

JULIE McCROSSIN: Does the little yellow bus have a driver?

CATHERINE CARUANA-McMANUS: No, it doesn't. It is a little autonomous yellow bus. It is on a defined route, it is just on like a little route and you can book a segment of that route and it will pick you up if you are there at the bus stop and take you to the next one. But it's really important that cities engage around this because, ultimately, all of the challenges you have put forward, we don't understand those if we're not learning by doing. I'm not going to also refer to the whole thing around private and security because we can have a whole conference on that. I note your concerns. Frank, if he gets the opportunity, will share with you the very important piece of work the IoT AA have done on security guidelines for consumer devices in the Internet of Things and, absolutely, it is really important that we look at all angles about the use of technology. Thank you.

JULIE McCROSSIN: Just before I come to you, Nadeen, I'm trying to listen and think what are the principles to assist citizens and communities? I think our Shadow Minister talked about transparency, accountability and clear standards and the other thing she talked about was avoiding blame-shifting between different regulatory and complaints agency. Again, I'm asking you to help me - what are the themes that are developing here that go to guiding the way forward in this ever-changing world from a consumer and citizen point of view? Thank you, Nadeen.

NADEEN JAYASUNDARA: A lot of comments is around accessibility as well, whether it's language, physical way of connectivity. I concur as well. Even for some of the smaller association bodies, joining up with bigger bodies, IoT AA, ACMA, the ACCC, that's a way to get these issues heard. As you say, privacy and security is the key one and lays out some principles.

JULIE McCROSSIN: We have time for one more question.

>> I wanted to expand on what that fellow said and what Catherine said. It's our understanding of what the new services will mean means we will have to do. There have been many Google cars already involved in a small number of accidents. In every one except one, which was between two Google cars, they were not the fault of the Google car because they had been following the rules. We have a society that's used to breaking the rules when driving. How do you deal with a society where cars don't break the rules? We are not used to that. Changing the standards also means changing our appreciation of how we obey the rules ourselves. It is more complicated than just the standards, it is also our behaviour and expectation. Something will be safer and faster and yet, when there is a car that finally, unfortunately, kills somebody, there will be a big issue and it might make a decision about whether it kills a pedestrian or another car and there will be an algorithm behind that and we haven't even begun to think of what the insurance issues are about whether the algorithm writer was the one at fault or not -

JULIE McCROSSIN: Lovely work for IT, law, accountants and actuaries.

>> For people to get involved in understanding what is good. Is it better to have more cars that kill less or not?

>>

JULIE McCROSSIN: It is a fascinating conversation. Do I see media stories about this? Is this in the public domain? In the last 48 hours, I've heard two stories, both in the last 24 hours. One is at the moment ASIO, the Federal Police and a whole lot of agencies in Canberra are having a hack-a-thon where they are trying to hack each other's systems in order to find the flaws. That obviously goes to the sort of security issues we have been talking about. The other thing I heard yesterday I'm pretty sure a new European standard has been set for autonomous vehicles that all human life is going to be equal. It was a really short news item. I remember thinking, "All human life is going to be equal and that's really important for autonomous cars". How I describe it as an outsider to your world, I didn't have a hook in my head to hang that information on. It stuck in my brain because it is such an unusual thing. That is perhaps a standard?

CATHERINE CARUANA-McMANUS: It is. Just because it has been invented doesn't necessarily mean it actually is going to eventuate. Carlo Ratti, he has done an amazing piece of research which questions the whole paradigm of autonomous vehicles. They work very well when every single thing around them is autonomous but when you have non-awe tonne autonomous things around it, there you go. RATTI. MIT. Deep thinker. Has done some very excellent work in the mathematics around autonomous vehicles.

JULIE McCROSSIN: The reason I raise the news items was that is part of the role going forward for people like yourselves is to give the public a frame work within which to understand these issues so we can participate? Because this is a very conceptual world. Do you want a large comment? We enjoyed you both.

NADEEN JAYASUNDARA: Look, okay, I think, as you said, there is a whole conference you could have on privacy and security. I don't think we necessarily have all the answers. Some of it is going to be policy. Some of it is going to be enacted. Some of it will just be standards but it is important that everyone brings their different views and keeps challenging and raising that. Especially at the early days of the technology. We talk about the internet as well. You need to let it flourish and have innovation but you've still got to have some bounds, some values.

JULIE McCROSSIN: Transparency, accountability and clear standards and - what was the other one in accessibility. I want a prediction. Who thinks, in five years' time, if you come to the ACCAN conference, we will step outside and get into a vehicle without a driver? Okay. Who thinks you'll go outside and drive your own vehicle or someone's in the bus? You are a very uncommitted group of people! You don't know, do you? That was a "don't know" answer, would you agree? Thank our future viewers here, thank you very much.

(APPLAUSE)

JULIE McCROSSIN: Ladies and gentlemen, in a moment, I'm going to invite up Hugh Bradlow, who will talk about artificial intelligence impacting the connected world. Firstly, have you got Video 17, boys?

(VIDEO PLAYS)

>> Hi, my name is Tapia. This is a story about me and my family. Hope you enjoy it.

(ALARM)

>> You only slept four hours last night - not good. Get home early today, take some rest. Do you need coffee? Espresso?

>> Espresso.

>> Tapia...? Did you see my lipstick?

>> Reorder Lux no.7 lipstick.

>> Thank you.

(HUMMING)

(HARMONIOUS HUMMING)

>> It's been two weeks since last time you called your mum. Maybe it's time to start calling each other.

>> I will... Call my mum.

>> Yes...

(PHONE RINGS)

>> Moshi-moshi...

>> Tapia - top robot companion.

JULIE McCROSSIN: You have to clap it.

(APPLAUSE)

Seriously, I want to thank Richard and the team from ACCAN, who've put a lot of work into collecting and curating these for you.