THE IOT PLAYBOOK – SCHNEIDER ELECTRIC IS ALL IN

EPISODE 46 PODCAST TRANSCRIPT

With me today is Prith Banerjee

Prith is EVP and CTO of Schneider Electric, reporting to the CEO. In this role he is responsible for driving innovation and tech differentiation, and coordinating the R&D activities of the company's five businesses with 11,000 R&D personnel, and a 1.2 billion Euro R&D investment. Previously, he was Managing Director of Global Research and Development at Accenture.

I met Prith for the first time when he was at Accenture – he keynoted at the IPv6 - IoT conference I used to put on.

Prith, welcome to the show!

So what type of IoT activity have you been up to with lately?

As you mentioned Schneider Electric is a very big global company that specializes in Energy Management and Automation. As you mentioned we are a 27 billion Euro company with. We have a lot of products in Energy Management and Automation. Our vision for IoT is to connect all our products and to ultimately drive customer outcomes in the area of energy management and automation. Some of the products that we have include mobile digital products that we use in building…contractors, plugs, switches, panels, circuit breakers, and so on. 5:00 Medium voltage products like switch gear, transformers, substations, sort of all the way from thousand volts to 56,000 kilovolts. Then we have industrial automation systems in different verticals like oil and gas, mining metals, water, etc. And finally we have a very big data center business essentially powering our data centers. A lot of products, in fact we are about to launch more than 365 new products this year and our vision is it will be all IoT related because we believe that our customers greatly benefit from connectivity of these products and solutions.

Are you saying that 365 new products that are being launched this year will be IoT-based products?

Not all of them but a significant number of them and our vision is we'll have literally millions of our products that we have in front of customers all connected to IoT. We have an IoT platform running on the cloud and we will make sure eventually all our products that are connected to the cloud.

Why don't you start by telling me a little bit about yourself and your background in IoT?

I spent about 22 years of my career in Academia at the University of Illinois. I started working in IoT when I joined Hewlett-Packard where I was head of HP Labs. At HP Labs, we had a very exciting research project on the central nervous system. We did a lot of interesting work on sensors, connectivity, and analytics and so on. From HP, I went to ABB; I was Chief Technology Officer at ABB.

ABB was a very similar area as Schneider Electric; they're in the power automation area. At ABB, we did a lot of work around IoT and remote services and connectivity. Then I joined Accenture. Accenture is very big consulting company. We have a lot of work around IoT at Accenture. We started in IoT business in my 2 years, very, very exciting work. I was involved in some of the IoT activities in Accenture Technology Labs, which ultimately been business. Accenture now has a very big IoT business. Why leave Accenture? I was part of some top leadership; we presented some work at the World Economic Forum around how IoT has very interesting trained customer outcomes. And now that I work at Schneider Electric, we are using some of those general things that I taught at Accenture and actually helping to take into market. So essentially in the energy management and automation space, trying to see how all the connectivity can drive into end customer's, all productivity, all remote services but essentially driving the business value for our customers.

We met when you were at Accenture and quite frankly, it seemed like you had a pretty good gig there. Moving over to Schneider, was it that you just wanted to take it to next step and productize or what was the big motivation for you to move over?

Again, I was very, very happy at Accenture but I was responsible only for the R&D so it's smaller operation. At Schneider I'm responsible for the technology strategy for the number of businesses, how we invest our 1.3 billion in the right things for the company and leading a 12,000-person R&D team is a much bigger role than I had and being part of a product company is quite exciting.

It's a definitely a bigger swinging role. Now I look quickly at the Schneider website and I noticed that IoT is just one of 13 solution sets that Schneider provides. What's the relative importance of IoT? We've been speaking IoT but is this a small thing, is this a big transformational thing? How important is IoT to Schneider?

10:00 IoT is the biggest thing that is happening in terms of connectivity and business model changes actually. The website is a little out-dated but basically we are putting our biggest efforts into IoT. I think something that I can share with you is that we recently took a survey of our 2,600 customers across several countries and these were the top decision makers. We asked them, what do you think are the changes, how can we help you? These are 2,600 of our customers and we asked them a lot of questions saying, hey, you know Schneider; you know our products and solutions in the energy management and automation area, what are the most important things? 75% of our customers say that IoT would create really new business opportunities for them in the near future. When we asked them, why are you interested in IoT? These are our customers telling us that cost savings was the most likely reason for implementing IoT. So our customers have but basically, IoT is not really a vision that it's going to happen in the future, this is IoT is here now and so they are currently using some of the IoT solutions that Schneider is providing. Our customers feel that the estimated savings from implementing IoT are large, yielding a more than 50% Return on Investment. They were very, very clear. We asked them how much percentage and they said 50% ROI in areas such as faster problem resolution, improved productivity, higher levels of operational efficiencies, and so on. This is a big deal for our customers and therefore we, at Schneider feel very, very excited about it. As you said, we

have 5 businesses, our partner business which is the business that we do around residential buildings, commercial buildings, critical infrastructure building – that's 40% of our business. IoT is going to be a big, big thing for that building business. When we are in the building business, we do metering, electrical distribution of the building, solar building residential and so on. All of those eventually will be connected to IoT and so our building management system, which runs our HVAC cooling, operational efficiency of the building will completely be changed. Building management system will be changed completely to IoT.

The next thing is our energy business. This is where we work with utilities and smart grid. Utilities have start renewable is going to be a very big thing in the future so as you have in the past, power generation happens to, steady power sources but as the world is moving towards more renewables through solar, these renewable energy sources are a lot more intermittent and so we are coming up with IoT-based solutions in the area of micro grids. You have renewable energy; you have intermittent power generation so how do you work with utilities in terms of smart grid solutions. We have a lot of very interesting software assets and what we call Advanced Distributed Management System powered by IoT. It will help our utilities to better match the demand and supply so that they don't have to invest into a lot of new power plants. They can do very smart demand response and some supply management using an IoT. That's a very, very big deal. Industry business, as I said we have different solutions in electro intensive businesses like oil and gas, mining metals, and so on. As we talk to these oil and gas customers, in fact this week I was in Houston talking to many of the oil and gas customers – all of those companies are looking for IoT-enabled solutions so that they can drive much better operational efficiencies and so on. Some of the Schneider solutions enabled by IoT will allow them – mining companies, oil and gas companies, water companies and so on – get much better efficiencies. Finally they are in the selling area of data centers, you talk about the largest data centers in the world from Amazon, Google, Facebook, Microsoft – these data centers consumed 15:00 50-200 megawatts of power. So how do you come up with a good power distribution system so that you can reduce the power consumption again through IoT? So there are very, very big opportunities.

I think the survey results are very interesting. I'm surprised quite frankly that 75% are actually keying on to IoT today. What I'm not surprised about though is that they're keying into operational efficiency and cost savings. At least in my experience, that seems to be the thin edge of the wedge. People can get their arms around efficiency; maybe operational efficiency has slowed down in the last few years looking for a way to squeeze out a little bit more out of their current businesses. But I like to ask your opinion on the evolution from bottom-line efficiency to top-line growth. What we've been speaking about to this point and I think it makes sense because this is where perhaps the current knowledge is about IoT has been in operational efficiency, but what are your thoughts on growing and creating new businesses for your customers, providing products that allow them to increase their revenue as opposed to being more efficient?

In our survey, we asked them what they're using IoT in terms of taking immediate savings and so on. 70% of them said in different areas in the area of industrial automation, building automation, energy

management, people monitoring– 70% of those people surveyed said that there's a tremendous opportunity for IoT in these areas. But then asking them specifically about areas, 40% of them said in terms of faster problem resolution, 39% said in terms of improved productivity, 39% higher levels of operational efficiency but that's not right. We could have asked them, what the future is. As you said, the immediate solutions with respect to this sort of faster problem resolution– these are the here and now solutions but what we are investing in the future is our end customer outcome side, the topline for newer business opportunities. The analogy that I like to draw is, look at the iOS or Android platform, once you have a platform, you can enable other people – those millions of app developers on iOS platform who are creating all these very interesting solutions and services on the iOS platform. We believe that what Schneider is creating to our IoT platform, which we call the Digital Services Platform – we have an IoT platform with all these millions of connected products, all these connected products that data will be uploaded to this IoT platform. Just imagine, think of it as the iOS platform. This will make this data available. Through the right APIs, people, developers throughout the world can tap into the data on this IoT platform and create new interesting services.

When I was in Dubai for the IoT World forum talk, I kind of talked about the different ways that we can help drive problem in different domains, in the area of energy

One, in the area of energy management, there's sustainability. Second one, in terms of all operational asset management. Essentially, we have a bunch of assets. How we can drive. Second one is through smart, productive operations. Ultimately, the last one is about using augmented reality. Once you have all these connected things, what kind of new services are you going to try? Those are the four areas that we see in terms of energy management asset optimization, smart operations and interactive or simulation, insights and augmented reality and so on. There are tremendous opportunities for top-line growth and ultimate customer outcomes.

A basic example, when you look at a 20:00 tractor company like John Deere. In the past they sold tractors, now these tractors are getting more IoT-enabled and therefore with that tractor, supposed I can connect that to all the data that those tractors are connecting to the weather reports and eventually can I provide farming as a service? Just like tractors, instead of selling tractors, if you can provide farming as a service that will be very interesting top-line revenue. What we're essentially designing for the future is, we are in the energy management automation business so rather than selling a smart canals for a thousand dollars to a building manager, imagine sort of transforming to a building management as a service. Supposed you are the Hilton hotel, what does that building manager of the hotel ask for? He is interested in providing a fantastic experience – very good air quality, very fantastic experience to all the people who are staying on the hotel and they're interested in reducing the energy consumption. If you are a hotel owner or the building manager, you are interested in this top-line stuff – improve air quality, improve efficiency, etc. you are trying to go for that ultimate building management efficiency and improve air quality and so on. That's the kind of service that we are essentially positioning Schneider to go to, essentially providing to a building managers as a service.

That makes a lot of sense. I want to key on a couple of points that you made for our audience. The first one is the platform and it took us about 16 minutes before we started talking platform and the reason is it's really important. But I think we need to generalize that a little bit more and look at it from the perspective of the audience. Schneider is going to be providing a platform but I think what you're saying is this platform, maybe I'm wrong but I think this platform could be used by some of your customers to create a platform within their particular niche or within their particular industry so that they are, in your example potentially offering energy management as a service or building management as a service but even going beyond that – that's just one type of business model as the service business model – even going beyond that, you talked about outcomes and being able to use their platform maybe that's based on your platform but use their platform to bring in together all the different products that are required using the example from Hilton to provide that experience. And then it's not necessarily even a service then maybe it's an outcome, it's a result that they're looking for.

I just want to make a couple of points. The first point being platforms and it's not just a Schneider platform; it is a Schneider customer's platform. The second point is that the business model of service is just one of the business models. Ultimately, you may want to line your business model to more rooms – how many rooms are sold then you get paid based on how many rooms are sold, if you know what I mean. What are your views on both of those points?

First of all the most important thing that we are working on is our platform. Again, this whole are of, when I was in Accenture, we published an Accenture Technology Vision in 2015, which survived with the fact that the whole industry moving area from this horizontal platforms like iOS, Android, Samsung to more industry specific platforms where companies like VW and Mercedes are coming up with automotive platform. Now that I work for Schneider, I am focused on this vertical in the energy management automation space. We want to create a platform in this industrial equipment space so that this is the platform for our customers in this vertical. It's a very big industry because energy management and automation sort of the buildings, residential buildings, commercial, infrastructure buildings, data centers. We want to provide 25:00 the leading platform in this area. Now the inner platform, this is sort of API, it's a technology to how you use the different things in the platform and all the different software that call building blocks that will be provided by the platform. But the other very interesting thing is around that platform. Supposed I have a sensor that is just measuring the temperature of a particular room in one of the buildings and that data is now available to developers. Once they have the temperature, what kind of other value can you create? I just give you a very simple example. You have a parking lot and in that parking lot is filled or empty. Once you put in a sensor in the parking lot, that one bit, full or empty is available on a parking lot platform. Essentially you can have all kinds of people creating services. When I drive into the city of San Francisco, on an iPhone app for finding parking, essentially I created from their parking lot a value to that information. Would be interesting to know exactly if there's parking available on the 4th floor of the parking lot on. That's the kind of value that I'm trying to talk about. You have this IoT platform and you have all the data on

this industrial space, in energy management and these different areas and ultimately using that. This is a huge space.

Let me dig into the platform a little bit more so I understand. Will Schneider be selling the platform so that one of its customers can do what you're saying for example provide a platform for the parking structure and then creating an ecosystem around that platform for parking or will Schneider not be selling the platform and just encouraging through APIs the use of this one omnipresent platform?

We are going to this discussion so that. From an R&D perspective what my team is building is this IoT platform. Essentially we have different phases. First of all, we are building this platform for all our Schneider businesses. We use the same platform for all these connected products that we have. We are literally thousands, as I said we will launch 360 plus new products this year. The first thing is making sure all our Schneider products in these different businesses that I've talked about – buildings, in industry, energy, IT infrastructure – they're all connected to this platform. First of all, let's get it right and make sure that our products are using this platform. Then the next step is sort of driving the whole industry towards embracing this so it becomes the default choice for our customers because we have a very big market share in this area, we will try to influence everybody to use this platform. Ultimately, the business model will evolve so that our customers will enable our customers to leverage our platform to create more value to their customers. The journey is moving from products to products and services to ultimately driving outcomes.

That makes sense. I think what you're saying, what you're implying then is Schneider's business model is also going to change. Then let's look at it from a different way and let's think about it from the listener's point of view. What can they take away from this? I'm thinking from the point of view of an enterprise who's about to first approach IoT, they're deciding on how they should take advantage of the technology and then the next thing that happens really quickly is should they use a platform, should they buy a platform? Just generalizing, in your experience, turning it inside out or turning it the other way around for our listeners, what's the advice that you would give them when they're first approaching IoT with respect to platforms?

First thing I would advise is that IoT is not just anything in the future; 30:00 IoT is here right now. People have been talking about it for the last five years. When I was at Accenture, I was doing this a vision, I am just telling your listeners that IoT is here and now exactly happening, people are really seeing value in terms of faster problem resolution, improved productivity, and high levels of operational efficiency. Our customers, the 2600 of our customers that we interviewed and therefore, us at Schneider are doing this, all our products are connected and so on and so forth. Your listeners to also see IoT is here and now, we should absolutely do it because there's some immediate value that we can see to their customer. There are obviously challenges like do you build it yourself, if you're a small company you cannot do a platform yourself then you need to rely some of the other. Again, from many of the IT are providing, making it easier for you. If you ever do this IoT stuff, 5 years ago it was quite hard. Today, you have choices, you have an IoT on Microsoft as your platform or you could

do it on Amazon Web Services. There are four or five platforms in the IT community that you can use. This whole bunch of open source stuff that is out there so it's relatively easy. You have a product, to make it a connected product; you have to essentially connect that through Zigbee, Bluetooth, Wi-Fi, 3G, 4G, etc. through the wireless or wired to something on a different device and upload that. The thing is that today in the IoT industry, these technologies exist, it's not in the future we'll be connected. We, at Schneider are leveraging all the stuff from the IT industry in terms of connectivity to the cloud. So there's cloud infrastructure, cloud platforms that are available so we at Schneider, our platform is leveraging one of those things. I don't know exactly but that's what we are using. Communication technology exists, how you move this data to the cloud and so on. Then in this area, people have figured out that if you have millions and billions of products and if you are uploading everything to the cloud, the cloud doesn't have that kind of bandwidth. So what you need to do is you need to do some compute at the edge. You start uploading everything to the cloud. do a little bit of compute at the edge and so this brings us to the concept of edge computing. Cisco calls it fog computing. We are doing our own implementation of some computing at the edge, and then taking some information and uploading that to the cloud. The reason for that is sometimes you will have very good connectivity, other times you will not. Some of the things have real time requirements you don't want everything to go through the whole process; you want to meet some computing decision that can be done at the edge. These are complex things but in this community, people have figured out how to do this. If you are a listener on the podcast and say, yup, it's not a thing of the future, it's here and now, how can I do this? Your listeners need to think. They are in whatever business – parking lot business, billings business, or driving business. How does that product there your listeners? They have to understand the benefit of connectivity to their end customer. They're driving their customers around. Their customers are looking for an improved transportation experience or they're looking for a better building experience. They have to really understand what is the primary driving point of their customer's outcome, into that connectivity of these products, how can I improve their customer outcome? If you are in building, how can I improve my building efficiency, my workplace efficiency? Some of the products that we found in the buildings area in terms of IoT is, a person, when I walk into a building, through the RFID sensor, the building will know Prith has walked in. and then connected to my iPhone or Android phone, I'm able to control all kinds of things – 35:00 Prith really likes 72.4 degrees temperature and they'll provide that kind of personalized experience. With the building management system, I could provide that fantastic personalized experience. This is kind of what I'm asking, I want to drive the best possible experience in terms of air quality, temperature, moisture, humidity and so on to get to know, drive all the HVAC systems to drive that proper air handling and so on. That's what I would ask or challenge your listeners, your listeners are in some business, what's their business, who's their customer, how do IoT improve the experience and outcome for their customers.

That makes a lot of sense. Let me just paraphrase some of what you said and correct me if I'm wrong. So the first thing that you're saying as advice is, don't wait. IoT is here now and at a minimum, you need to start examining it and probably doing something about. Examining means let's start doing some business planning. And then what you're saying is in the past you

could've built your own platforms but there are a lot of platforms. In fact, you mentioned 5 major ones and as you know there are hundreds of varieties of different types of platforms, sometimes they're industry specific, sometimes they're more functionality specific but I think what you're saying as advice is use a platform, that's not really where you should be putting your effort. Where you should be putting your effort is to try to think about your customer's outcome, the results your customers want and then how you can use connectivity to improve that experience for your customer. Am I getting it right so far?

You're absolutely right; this is exactly what I'm saying.

So then the next step that I want to ask you because I kind of preach a very similar story in the sense of unless your core competency is plumbing or networking then yeah, use a platform. but then the next question after that is, okay, we're starting to focus on our customer, on the outcomes, on the results that they're looking for – how does an enterprise prepare? What intellectual property do they need to develop in-house versus out of house? And I think one of them is, you've identified is the platform so the plumbing, that's out of the house. But what type of intellectual property needs to be developed in-house so that you can actually realize that vision? You're going to have the vision of providing a better result for your customers, through connectivity. Then you're going to be using a platform but there's a gap. There's going to be a gap between there. What's your advice for how does the enterprise get prepared to start realizing that vision with IoT?

Let me give you an example from our own business. As I said, we are in the energy and automation most specifically in energy management automation. The kinds of intellectual property that we are developing within Schneider, we have energy and system integration professionals that go into a building and they challenge us with questions like, which facilities are underperforming? Where should I deploy the energy efficiency projects that will generate the most results? How do I put all of this into an IoT driven data together and translate to their value, to the owner of the building, the multiple buildings. Energy experts, the IT that we have, do all the connectivity saying is we connect all this multiple forms of data like energy, utility cost, water consumption from multiple sites and sources and sending all this data to this server. One of the things that we have is our resource advisor software. Using this resource advising software you get basically a dashboard. Our consultants, our services people going to a building manager and say, "hey, we've connected all these things and we are telling you your building #152 and this light is really, really bad, we can help you improve it. What can we do?" To drive any value, first of all you need the sensors to collect the data. You need to show through all the dashboard, adviser software that this in the energy 40:00 efficiency is.

Another example. We have a business in utility. In the asset availability area, we work with a customer, Duke Energy. Duke Energy has 60 plants, 7 million customers, and they are actually the customer of Schneider enterprise asset performance software. We have a software called visibility analytic software. Using it, Duke was able to see that they have all this 60 plans, all kinds of stuff is happening in terms of exhaust temperature, combustion engine, so on and so forth. And they found that a

particular wind turbine was heating 50 degrees Fahrenheit higher than historic levels. We were able to provide that on this IoT platform that we have. The following weekend, the station was conducting an exam of the burners and so on, no issues were found. The manager said, you know what, don't worry just ignore it. But instead, our customer Duke said, "you know what, maybe there's something going on." They scheduled a maintenance and they found that there is a problem with the combustion, the transition, rotating blades all of which needed service. They did the service but because of that, estimated cost was half a million dollars just for this one particular turbine. Overall they found that through this visibility management they were able to save 5 million dollars. One customer. That's the kind of value that we provide. I just gave you two examples of how using IoT, in the energy management space, how we can provide value to our customers. Your listeners need to think about what's the equivalent of the resource advisor and the

To generalize that a little bit, a couple points that you made that I think are really important is the first one is kind of this business consulting in the sense of in your first example where you go into the business, into the building for example and you understand all the processes. It seems like a skillset that needs to be developed is almost as business consultant. I don't know what the actual term is but instead of this one-time sale, you're going in there as a partner. To be a partner, you need to understand your customer's business really well and consult with them. It's almost like a services consulting.

Our Schneider, we have this 4 businesses which are more product business and then we overlay with the global solutions business and the vision of that is to really understand we have the different verticals like oil and gas, mining metals, and water – we have these different verticals and we are essentially providing this kind of partnership in terms of the value and in terms of the IoT business is embedded within our global business solutions

I think generalizing it, following Schneider's lead in the sense of think about it as a service as business, in the sense of trying to make your customers successful because ultimately, if you can tie your business models and that get to end results and so forth, you can tie your business together, then everyone rises with the tide. I think the other thing you mentioned I saw as really important was predictive maintenance generalize that the data science. I think my recommendation for a company is that they need to from an intellectual property of view, and I'm going to ask you how this manifests itself, but they need to become a data science company to a certain extent. What are your views there and what are the practical implications or the practical advice that you can give companies on that?

Basically with IoT, one thing is that everything is getting connected. If you look at projections, there's going to be 50 billion connected devices. The problem with that is that if all those devices are generating or collecting data every second, every microsecond, just imagine that amount of data that we will be collecting. Ten years ago, nobody had an iPhone; nobody was taking pictures 45:00 on a phone just with small cameras. We were not generating as much data and now we go on vacation and we take zillions of pictures on our iPhone, upload it to the cloud, so they're just literally generating so

much data that is hard to analyze all the data. The problem of data analysis is going to be more and more problems. We completely flooded; drown in the amount of data. You need to do more machine learning, more analytics, and so on. If your listeners are in this area, you couldn't do some of these things in the past. Today with the advances of machine learning and data science analytics, there's a whole bunch of open-source software that exists, you could literally do some very simple machine learning on the data. Essentially that machine does 90% of the staff is. Human goes in and tries to add a little extra manpower. And that's the value. The value is that machine doing some automated learning combined with some human learning and do the combination of human and the machine doing fantastic things in terms of advisory services to your customer.

That's a good point. Just to drill down a little bit, machine learning is often, and we've talked about this a little bit on the show but machine learning is being used more and more for model making. Developing these analytical models and like you said the next step then is the machine takes the first step and then you need a data scientist to go there and tweak that model. But really that is going to be the core. We're talking about a services kind of core company. You talked earlier about using APIs so I think another core competency that a company needs to develop is going to be software, they're going to have to connect up with the APIs if they want to use these platforms. And then the third one being the data science and in particular you're bringing up the point of there is lots of open source software that you can use to get you along the way. Data scientists seem to be in pretty high demand right now and I don't want to answer my own question here but what are you seeing from your customers as being the stumbling blocks to being able to embrace IoT, to be able to work with Schneider with their platform. is it human resources like data science or am I just overthinking it? What are you seeing now as the stumbling blocks for companies to get engaged if they're in your business for example?

I think cyber security is very, very important. What do you see are the challenges? 50% of the customers said cyber security is very important. One thing to have everything connected but then once things are connected; obviously cyber terrorists can do more damage to cyber than throwing in a bomb. When you have a critical infrastructure, energy and all the things are completely connected. The cyber security aspect of it is very, very important. People who are security knowledgeable are very important challenge also. Within my R&D team, people who do analytics work and data science people, I have cyber security people, I have IoT people. That's why in my R&D team I have big research areas in these big, big areas.

That's an important one that usually comes up and I'm surprised it took us long to come up with the cyber security. That was the number challenge. I'm just curious, do you know off-hand what the other challenges the people in the survey kind of identify as being stumbling blocks for them to move forward?

As a community, I think one of the challenges that we have to really address is how you monetize this outcome. Are our customers willing to solve this? We all follow the business models, right? Our customers today in the world of sort of hard products are used to buying a product for a thousand

dollars. They see the real value of an iPhone. If I buy this phone, I'm going to pay 50:00 $600 for this iPhone. But the transition from this iPhone to a world out there where the form is free, the iPhone you pay for then sends for every time I make this thing and accessing the information, I need to find my nearest Pizza Hut restaurant, this information is worth 15 cents to me. To actually move the whole world to a new business model of this outcome, people paying for outcomes is actually a hard thing because in the world of homes and Internet, we get so used to getting everything for free. Google has figured out that the way to do it is Ads. You can have ads for this but in the industrial equipment IoT space, you can't have an Ad. The challenge is how do we monetize? What's the business model that will allow us to move towards this outcome driven world?

That's actually a very good one and I'm assuming you're having those discussions not because of your customers, maybe also for your customers but because of yourself. You're going to have to have to monetize your products or you're not going to have to but I think you want to take full advantage of the IoT technology that you're developing, that you're going to want to monetize in a different way.

I'll give a simple example. Our governor has said California needs to go towards 30% or 50% renewables by the end of year 2020. Some of the solutions for that will be each of us, residential customers; we should be contributing renewables so therefore we put some solar panels on our roof. Today, companies put a solar panel on top of the roof but there is no storage along with that. Throughout the day you have solar and then the evening, I rely on I need to deliver the power. Basically during the day time I get enough solar and then essentially selling that power to the I used to be able to sell power to. In the future, it will have energy storage; it has its own battery announced a battery system called eco plays, which is actually much more cost effective... just to add something, we just had an eco-plating, which is an energy solution, which has a cost below $500 per kilowatt hour. What I'm saying is at some point in the future, you will be able to gain residential customers who have solar panels on top with their own energy storage system. The question is, does a customer put in the cost of say $20,000 as a way to buy the solar panels? Versus, you as a customer don't have to pay. You pay for it as a service. Some customers have made the move through solar but others are going through this. Those are the kind and now once IoT-enabled solar panels and smart panels and energy; just imagine what i could do? I have a solar panel and charger, on an iPhone app, a text pops up "hey, do you want to buy the energy from PG? from this price, I'll be able to track down your dishwasher?" Just imagine all this connectivity, I am now 24/7, I'll be able to see and respond and participate on demand and splay. So I said, "no, I don't want to use my washer and dryer, let me turn it down". I'm being simultaneously supplied and demand side management to all 100 million hoes on the office.

Like you say, what you're implying is I think that the innovation and business models are going to be 55:00 probably as great if not greater than the innovation in the technology. Alright, Prith, that was very interesting and useful. How can people find out more about yourself and Schneider?

They can go to our website www.Scneider-electric.com. They can access my IoT forum talk in December in Dubai.