



"Wipro's Play in 5G Conference Call"

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MANAGEMENT:

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Moderator: Ladies and gentlemen, good day, and welcome to the Conference Call on Wipro's Play in 5G. As a reminder, all participant lines will be in the listen-only mode and there will be an opportunity for you to ask questions after the presentation concludes. Should you need assistance during the conference call, please signal an operator by pressing '*' then '0' on your touchtone phone. Please note that this conference is being recorded. I now hand the conference over to Ms. Aparna Iyer – Vice President and Corporate Treasurer. Thank you, and over to you.

Aparna Iyer: Thank you, Stanford. A very warm welcome to all of you to our "Technology Point of View Call on 5G." We are joined by Milan Rao – who leads two of our businesses globally which is Manufacturing and Communications. He also leads the core transformation office of Marketing, Innovation and Technology. We also have with us the Chief Technology Officer of Wipro, K.R. Sanjiv and the CTO of the Communications BU, Viswanathan Ramaswamy.

We will begin this call with an overview on 5G, our readiness in this space and the initiatives and investments that we have been making by Milan first, after which the operator will open up the bridge for questions. Over to you, Milan.

Milan Rao: Thank you, Aparna and thank you everybody for joining this call. At Wipro, we are very excited about the possibilities that are on offer on account of 5G and over the course of the next 15-20 minutes, I will talk to you about our point of view on 5G what we believe 5G is going to be doing, what we at Wipro are doing in 5G, what are the kind of investments that we made in terms of developing our customers, our skill sets and our technology process around 5G and then we leave it open for some questions after that.

Clearly, most of you obviously know this but as a preface, 5G is of course the next generation mobile telecom technology. We believe that there is revolutionary lead from the previous levels of technology on 3G and 4G, 5G offers much-much greater DSPs, we can actually see speeds up to 10 GBPS and higher, it offers significantly low latency as low as 1 millisecond, offers, the



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ability to have much greater power efficiencies and very importantly, also gives uniform and consistent user experience over a prolonged period of time.

One of the reasons why mobility was not able to provide use cases in the past, whether it's on the vertical side or the solution side, is because of the low latency which are on offer due to 5G, were not available and therefore we could not ensure that those use cases would work every time all the time.

5G, we believe of course will roll out over multiple phases. As we speak in FY'2018-19, we have seen trial phases being rolled out in multiple locations around the world. We believe that roll-outs of 5G will happen in the period from FY'2020 to FY'2022 and we expect to see massive adoption of 5G following that.

So the question lot of people would pose would be, "if it is going to be massive adoption after three or four years, then why are we talking about 5G so much right now." Well, the answer is going to be in what I talk about over the next 10 or 15-minutes because it is not so much the consumer adoption of 5G but it is the entire network adoption, the use case adoption and the research and development work which is being done today which offers us a large possibility, and as the adoption increases over a period of time that possibility will increase. As you know, GSMA has said that over the next 15-years we expect about \$2.2 trillion in the global economy to get generated on account of 5G technologies, we expect that mobile operators would invest upwards of \$480 billion worldwide between 2018-19 and 2020-21 in mobile CAPEX. That is a lot of investments that are going to be put in and therefore it is important for organizations such as ours to be participating in these investments.

We expect a significant amount of investment therefore from our side and also similar amount of return on our investment over the next four to five years.

Currently at Wipro, what all are we doing in 5G? Our vision is to be a premium partner for our customers in their digital transformation journeys as part of our



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vision as well but by leveraging 5G. We aim to be a leading solutions provider for 5G implementations for our customers. We expect that we will consult them to the technologies potential, taking into account the comprehensive market view and I will talk a little bit about our comprehensive market view in a bit and helping them realize the business values of new streams of revenue through new products and new services.

We also envision that there will be a significant amount of play in 5G engineering for devices, applications and infrastructure. And given the very rich heritage of engineering that Wipro has had over the past two decades and more, we believe that we are placed in a very good position to help our customers in those engineering efforts as well. We are currently working with multiple customers already across key industries and 5G related engagements. We are building a large number of use cases for their 5G journeys and each of these use cases we have more than 14-15 different use cases where we have between 20 and 100 people working on each of those engagements to build up those use cases.

Some of the engagements, to give you a flavor, building a 5G system for equipment vendors and semiconductor companies, designing, building, test and post deployment support of new radio for indoor access for network equipment providers, building software-defined network orchestrators for multiple equipment providers and operators across the globe. These are some of the gamut of what we are doing currently in 5G. More importantly though, what is it that we intend to do now and going forward because that is really where we see a lot of tremendous amount of excitement around 5G.

So, we have actually looked at 5G in two phases. I am going to call those two phases – The first phase as a run up and the second phase as the adoption phase. So what do we mean by run up and what do we mean by adoption? In run up, firstly, we expect there to be a tremendous amount of product engineering work in 5G. 5G enablement across the value chain will happen on devices, on networks, on applications which will be adopting 5G, there will be work which will be done right from silicon companies as an example work which



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is done on radio base band, etc., we will enable devices to communicate to 5G RAN that will require supporting 5G modems at device levels which is going to be a very significant opportunity.

Importantly, all of these underlying silicon and software must handle very huge data rates which are going to be enabled as a result of 5G, and that is something which is an area in which we are helping a lot of our customers.

Importantly as well the transition to 5G from 4G is a very important element and it will require devices to support multi radio capabilities across 4G, LTE and 5G and on. And those will be very interesting requirements to enable our customers with.

So, therefore if I may put it in a more holistic fashion, I would say that there are requirements across the semiconductor or chip set manufacturing companies. There are requirements which are across handset and device manufacturers. Handset and device could be basic thing like tablets or mobile phones, there could be CTEs, there could be 5G modem chips and so on. And then there are requirements which are across network equipment providers and more particularly RAN infrastructure, radio resource units and so on and so forth which we are working along with network equipment and equipment service providers globally to develop those. So those are the three broad categories in which we see engineering services coming together.

The reason why I feel very excited about this also is that as 5G gets rolled out, there will be multiple variants which will be there because the frequencies under which 5G is going to be rolled out, the spectrum availability is going to be very different in different locations around the world and therefore you will have lots and lots of variants, so for instance, variants in radio itself are going to be across 4G, across 5G, you will see many tens of variants because there are different carrier frequencies, different and diverse deployment scenarios, different power and different capacity requirements and so on and so forth. Because evolution of networks is very different around the world, you will also see significantly



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different back-haul capacity requirements which will be there which both the equipment providers as well as the DSPs are going to get involved and we will see a lot of work as we see right now on optical and IP routing on switches developments and so on and so forth.

And importantly, as everything moves to software-defined networks and software-defined everything and everything moves towards the cloud, we will actually see a significant amount of work on the cloudification if I may call it of 5G as well. So we see significant requirements right now and going forward in the product engineering services.

The second set I would call in run up to 5G is around the CSP providers or Communication Service Providers. Here we see a large number of deployment which will happen of new radios as each telco moves from 4G to 5G or some of them directly deploy 5G networks, there is going to be network feasibility, RF optimization, RF planning, aggregation of network operations. So that is going to be an important element. CSPs will need to fundamentally redefine their transport and core networks and that is a huge opportunity right from information systems modeling, back-haul of IP and MPLS, adoption of IPv6, architecture and so on and so forth. And importantly, all of these networks are going to be programmable networks and I think that enables the true potential of software-defined networks that we have been talking about perhaps for some years but we will actually see the potential of that getting unveiled as we go along and as we do network orchestration, BMF deployment and so on and so forth. More importantly, this is also going to land us to very significant AI and automation requirements on the network side. Traditionally, when we talk about IT, we talk a lot about AI on IT, but I think the AI and automation requirements on network side are actually going to be very-very large.

We also expect to see things that we have been talking about little while ago but we actually see them really happening now, things such as zero touch provisioning, network deployment with zero touch again enabled through a lot of automation, and of course we expect the traditional services such as YSS,



BSS services to also be expanded towards 5G, and I think by itself is also going to be a tremendous migration activity particularly in the period of time that we are talking about, the role outface if I may call it, that started happening now and expected to happen over the next couple of years.

And finally, there is going to be lot of value addition around Edge-based networks and Edge-based planning as you start getting mobile devices, how do you make sure that there is computing power which is available at the Edge so that the CSPs are able to support those kind of devices coming and the enormous amount of data which is going to get generated as a result of that.

The third one is I would say on industry process transformation. Clearly, we feel that there are four or five industries which are going to be completely transformed as a result of 5G over the next few years – Media, Banking, Utilities, Intelligent Transportation Systems, Healthcare industry and what we call V2X and really everything in the vehicle which is going to become bigger and bigger over a period of time. We are engaged in a number of pilots and POCs with all of these different industries. We are building application integration frameworks with each of these which will enable these applications to run seamlessly. Before we do that, in some of the cases we are providing lot of consulting services and consulting framework to these companies or 5G readiness, we can talk a little bit more about this and I can go on and on and on about what we can do in an engagement, what we can do in remote healthcare and so on and so forth but I will just keep it a little short right now. But there are tremendous opportunities in the industry transformation which are currently in POC and pilot stage and I will talk about in adoption phase where we expect that to be.

Then like I mentioned, tremendous opportunities around Edge Computing. I think that is an area where we will see a lot which will happen. We believe that there will be very large requirement by enterprises to completely redefine their products and processes to leverage the capability which is going to be offered by 5G. At the Edge, there is going to be a tremendous amount of computes, so if you look at for instance Fan Engagement in stadia, there is going to be a



tremendous requirement for application at the Edge, on post it on the Network Edge, anything to do with AR and VR will require that. Video streaming solutions are going to be very important with content and CoDeC which is posted on the Edge. I would say a lot of difference SaaS and PaaS players would engineer their components to be deployed outside the premises and on to the Edge. So that is from our perspective the run up potential of 5G which we are seeing now and which we will continue to see over the next few years as companies plan for deployment of networks and verticals plan for what they need to do in order to take advantage of 5G networks.

The second part of it is the adoption phase which is going to be a lot about the product and service innovation that I talked about. As companies get ready with their Edge offerings, the number of products and services which will come are going to be huge.

So let me talk about some vertical solutions which we believe are going to be very large from an adoption perspective. I am probably going to take a few because we do have time limitations but we can talk a lot more about this over a period of time. The first industry I believe is Media and Entertainment. I think content adoption and moderation is going to be very-very big. There is going to be tremendous personalization at the Edge like I mentioned for things like Fan Engagement in football stadia, cricket stadia, IPL, World Cups, Formula 1 and so on and so forth. There is going to be a lot of contextual ad slotting which will happen in media and we believe that is going to lead to a completely different way in which ad consumption is going to happen. So that is on the media and entertainment industry.

In Smart Manufacturing, we see automated production lines. We are going to see a lot of changes in inventory and supply chain optimization. There is going to be a lot of work done on remote asset management. And therefore when you think of a plant and you think of smart manufacturing, really everything from the inventory side to the actual production and supply side is going to get impacted in a very big way and therefore the entire play of industrial IoT is going to be



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come in there, and that is going to be fairly disruptive. In particular in manufacturing, I think I should call out automotive because we see tremendous changes in the automotive industry in terms of autonomous driving, assistant driving, in-vehicle media, I think that is going to be very-very different and lot of auto companies that we are working with globally are looking at with the advent of 5G and connected cars what do science do when they are in inside the car and I think there is a concept of thinking about the client in a car and what we can do with that connected moving person, I think that is going to give us a tremendous openings in terms of what we have to do in adoption.

Smart Cities is going to be big. We already see a lot of uptake on video surveillance, I think it is going to get bigger real-time insights as people move around and as people consume utilities, I think that is going to be a fairly big one.

Smart Energy and Smart Utilities, we believe is going to be big. We are seeing smart grids, we are going to see a lot more around smart grids, we are going to see a lot more around power sharing which is likely to happen, connected smart meters interconnected with inter-utility connections, that is going to be a very interesting one as we see energy and utilities kind of coming together with 5G helping out.

Lastly, something which is very dear to my heart actually is Smart Healthcare where not only are we going to see connected centers with hospitals and connected doctors but we are going to see tremendous uptake on remote health monitoring, remote surgery, smart ambulances and I think we are going to be able to save a lot of lives across the globe with the advent of 5G. So that to my mind is on the vertical solution side and we are working with all of these companies around this.

Gaming is expected to become much bigger and as we see ARBR the impact of gaming is going to become high and we see gaming across the world gaming a lot, currently gaming tends to be a very soloed experience but we see



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connected gaming is something which is going to really be on the uptake as well.

I talked a little bit about Enterprise and Edge Management but I would also like to talk about private 5G networks. I think that is a very interesting area that we see which will emerge. We believe that with our skills and global project management, with our system integration skills we will be able to help a large number of companies set a private 5G networks. We have capabilities across networking, network planning, optical cabling, we work on high performance Edge Compute, network integration, global connectivity where we have a number of partners globally as well and we believe that we have the ability to set up multiple large number of private 5G networks around. We have tremendous IPs in this.

We have Wipro Smart i-Connect which is an end-to-end Smart City platform which can be adopted and as we look at, as we ran adoption which is also likely to increase. I think that is an area where a lot of organizations are going to be spending lot of time.

That is the perspective on the 5G initiatives that we intend to take, the run up and the adoption phase.

Finally, I would like to talk very briefly on what kind of investments we have made over the course of the last couple of years in preparation for 5G from a technology perspective. We have created what we call the run up to 5G consulting and advisory framework. The run up to 5G is something that we are promoting ourselves from a marketing perspective as well and we see a lot of interest and requirements coming in from our customers on the run up to 5G side and the run up to 5G page that we have created. We have set up 5G Lab in Bangalore which we are going to be using for testing out infrastructure for end-to-end use cases. I think that is a very promising area for us. Lab as a service for deployment, testing and onboarding of use cases and lot of research



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that we intend to with a number of our partners who are co-investing with us in the 5G Lab and that is something we are quite excited about.

We have participated in a number of 5G platforms and ecosystems. We are very active in IEEE in 3GPP in the Linux Foundation, we are an important member of OVN app, acrino, we have thought of the NASSCOM 5G sphereco. It had to make participation and partnerships are also going to be important to take 5G forward and in particular the work that we do with IIT, Kharagpur as well as the Indian Institute of Science right here in Bangalore is important as is the research partnership that we are doing with a number of network equipment providers who really key partners of us both from a perspective of taking services from us as well as in terms of jointly going to the market.

We have a number of IPs and platforms which we have deployed ourselves. As you know, we have the Wipro HOLMEST™ platform. So we have AI-based network, automation, we have network orchestrator that we have created, we have an Edge framework that we have developed and we have a large number of IPs now that we are creating on the vertical application side that I talked about. So, we have created IPs around Fan Engagement, around intelligent transport systems, B2X that I talked about, Smart iConnect and these are all applications that we believe an IT can be leveraged as 5G is adopted more and more.

Lastly, I do want to talk a little bit about patents and people because I think both of these are very critical and underscoring the readiness of Wipro in this very important initiative. So, we have already had 173 patents granted to us in the field of telecom. There are additional 53 patents that are under application and we hope that they will be granted soon. By the way of these 13 are already patents that we have got in 5G-related development. So there is a very significant move from our side to be looking at generation of two IP and patents in the long run in the field of telecom and 5G in particular. We have a large number of people of course across the entire telecom spectrum that we have. We have more than 10,000 resources currently who are invested across 2G, 3G, 4G and now 5G technologies and we expect that as our customers and our



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partners move from 3G and 4G to 5G, we will be in a position to reskill these resources so that they are able to harness the potential that is on offer from 5G. So, we are really very-very excited about the prospect of 5G across the board for Wipro now and into the foreseeable future and we were really thrilled about sharing some of those perspectives in this call.

With that, I will hand it over to any questions that you may have.

Moderator: Thank you. Ladies and gentlemen we will now begin the question-and-answer session. The first question is from the line of Mukul Garg from Haitong Securities. Please go ahead.

Mukul Garg: To start with, just a basic question, what is the likely market size on the opportunity which you see coming up in 5G in both run up and as well as adoption phases?

Milan Rao: There are a number of different reports that have been created on this. I think we are in agreement with the fact that over the next five years it looks to be a \$10 billion plus market opportunity for our industry and we are looking forward to harnessing that.

Mukul Garg: Second question was I was actually bit surprised, security will be kind of key focus area in 5G. You have not focused on that on this call. Is that something which can add to this opportunity size, how large would be 5G associated security requirements will be from your customers both on the network side as well as on the telco side?

Milan Rao: It is a very fair point, a good question. Actually the way I look at it Mukul is that as you have data, there are two points which become very important and probably I have not spoken about each one of those because we speak about those in our big bet sessions – One is on Analytics and the Second is on Security. So just the incredible amount of data which is getting generated is going to give tremendous opportunities for us on both the sides. Since they are independent service lines that we talk extensively about in our general call, I



think we have not specifically talked about it. But maybe we have a point of view. Maybe I will ask Vishi to talk a little bit about the levels of security that we look at and then I just hand back to talk about the opportunity on an overall basis.

Viswanathan Ramaswamy: The release of 5G is going to bring in all IP network right from cloud all the way up to the device and IoT. The entire team is going to be in IP network. So that significantly increases the challenges on the threats that can potentially come over. So, we are working in all the layers of what we can do from a security perspective. Cloud Security, of course, which already exists which we keep doing. But beyond that bringing that from the core network, all the way up to the edge of the network, the mobile edge computing that we are going to be seeing, so what is the type of security that lead to handle in there to the device level security when we do an industrial IoT and those type of applications. So there is a need for security all across. What we are doing is we already have the CRS portfolio as you may be aware. We are building additional capabilities as a part of this 5G solution creation to include security at all of these levels, at the core network level, at the Edge network level and at the device level. So that is what we are doing already.

Mukul Garg: How large can be incremental opportunity on this over maybe next five years or do you consider this within the \$10 billion overall market size?

Milan Rao: Yes, definitely. The consideration is part of the \$10 billion. We do look at applications and services as an overall opportunity and I would say applications and services which include Cloud, Data Analytics and Security would be part of that.

Moderator: Thank you. The next question is from the line of Srinivas Rao from Deutsche Bank. Please go ahead.

Srinivas Rao: Maybe start first with what was asked previously. In securities space, if you look at the competitive landscape at least the way Gartner or other industry analysts



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have provided, even IT services companies do not feature typically in the Leader Quadrant. You have standalone securities services companies which have climbed up over the last couple of years. So if you could throw some light in terms of commentary as to how do you see the competitive landscape in that space? Second question is you did mention the demand is coming across two or three areas in 5G. To start with of course you have the usual network rollout but you also mentioned engineering services with respect to the handset, network equipment and semiconductor companies. How do you see or how much in percentage terms broadly if you can talk about demand which Wipro thinks would be able to capture? Thirdly, at least speaking to the telecom companies, the use cases do not seem to be very convincing to the telecom companies or at least they do not seem to be very convinced of the value which they can accrue, of course, there is a competitive so to say environmental and new technology comes in, in that context what is your view on 5G and how will the value accrue? To start a telecom company which actually has to lay the network and they have the burden of larger CAPEX. So your perspective on these three will be helpful?

Milan Rao:

Thanks, Srinivas for the questions. Indeed very insightful. Let me start from your last question first on the use cases and what is the return of investment. I do agree with you that at this point of time the return on investment is currently a little questionable. The obvious return of investment is on the utilization of 5G of last mile and as completion of networks or enterprises. I think that is something which is a fairly well established use case that is likely to happen. But I would answer your question in two ways: Firstly, which is why we have taken the vertical applications in the adoption phase that I talked about, not so much in the run up phase, because being on the telecom side myself, when you are there and you are creating those networks, you do not necessarily create all the networks except let us say NB-IoT kind of network, you do not create a network only for the use case in particular. So the network tends to get created from consumer rollout perspective, the ability to provide voice, data, applications and video of course. Now to the consumers and to the B2B side. As the network



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starts getting created, the monetization ability starts coming more and more. That is why I would say that in the adoption phase, the monetization part is going to be higher. So that is the first answer. The second answer to the question is that we need to make sure that use cases are created at all levels. It is not just the telecom service provider who has to think about the use case. The way we look at it is that we are expecting everyone in all of these industries that I talked about, whether it is media, whether it is smart cities, whether it is healthcare, whether it is auto, everyone to be thinking about the work to be done on those use cases. If I look at our consulting engagements around 5G, we are doing consulting for all of these industries and we see all of these industries also thinking about the use case at the same time. So unlike previous generations where the onus of the use case and the thought around the use case was on the telecom service provider today we are seeing industry-by-industry thinking about the use cases that they need to use to utilize 5G. And the reality is that on account of the fact that you have great latency, you have great reliability and you have the ability to get SLAs on your end use application. The applicability of the use case is going to be very high. That is why companies other than TSPs are also thinking about the use cases very-very aggressively. So, I think I see that as a change and therefore the congregation of the DSPs thinking about the use cases and the clients themselves thinking about the use cases on how to make that happen as an example an auto industry or healthcare or smart cities, I believe over a period of time is going to give us the return on investment. I think therefore for us it is important to be an orchestrator of these use cases not just for the DSPs but also for all the other vertical applications the companies on that. So, that is to the first question. The second part on the cyber security aspect, I request K.R Sanjiv who is our CTO to comment on it.

K.R. Sanjiv:

On the security side, we have been traditionally involved in security services around data center, applications, infrastructure, cyber security and we also have a strong offering around compliance to meet the industry requirements from a security perspective, PCI, etc., And in addition, you may be aware that we have made investments in four large companies which play in the cyber security



space. What we believe is that all these investments have a play when it comes to 5G. So, whether it is in terms of orchestration of responses to certain events around security, whether it is detecting the security or implementing the security modules in various services that are part of 5G, whether it is AI, whether it is the core ADM services, that is where we would bring together all these competencies, bringing it in terms of within the 5G framework umbrella. So that is a strong play we have. And there is a fair amount of investment which we are doing on this on building this framework for 5G. Edge is another area where we will integrate our SOP offerings in managing the Edge network from a security perspective.

Milan Rao:

Thanks, Sanjiv. To your last point, Srinivas, from a demand capture perspective of Wipro, I would say we are really well placed here because whether it is our network domain which is reflected across the work that we do in telecommunications as well as our technology business unit, engineering services where we have very large workforce which is doing work across 2G, 3G, 4G and now in 5G as well as the work that we do in all the other organizations that I talked about the silicon, the device, manufacturers. To my mind, we are really well placed because from an end-to-end spectrum perspective, we have the ability to look at all the use cases. It is hard for me to put a percentage honestly against the capture of the demand but I would definitely say that we are very well placed from an end-to-end perspective to address the opportunity.

Moderator:

Thank you. The next question is from the line of Viju George from JP Morgan. Please go ahead.

Viju George:

Just had a couple of questions. You did mention that you think a lot of use cases can come in from the industry away from telecom and that can act as a fillip for 5G. But I believe that will happen with a lag, right. Do you think that these use cases from various other industries like healthcare, manufacturing, etc., you pointed out, can actually take over or maybe lead use cases happening on the access side on the mobility side?



Milan Rao:

So like I mentioned, Viju, I completely agree, I mentioned specifically that in vertical solutions use cases are in the adoption phase of 5G. So you could argue that there is some bit of lag on it. That is what I mentioned but important thing for us is we need to be thinking about all of these use cases today and aiding our clients to be ready for these use cases as the extent of deployment of 5G increases. The other point I want to make also Viju is that there are some use cases while they will be in phenomenal form once 5G happens, there are use cases which can actually work on 4G advance as well and therefore the work that we are doing for the future also has applicability in the near presence and that is how we are looking at it. We are looking at this 5G as a very long-term, very big play which is going to enable us to generate business from now for a very long period of time. That is why we have so heavily invested across all the different parts of the organization and putting it together as one.

Viju George:

Just a follow up on that. Can you put your finger on what do you think might be an inflection point -- will it happen in 2020, 2021 or you think it is only a matter of when but you cannot really put a finger on when you think things might take off because frankly and also this is a question asked by my earlier analyst as well, that we have been waiting for this to take off but frankly it has lagged a bit than expectations, so do you have any inherent sense based on conversations with corporate and with telcos, when the takeoff point might occur and who would be leading this – would it be the US that largely leads this or do you think some other market can lead this?

Milan Rao:

So, let me answer in different ways. Firstly, I believe that there is a two or three year lag from a very mass level adoption where we are talking about. I think it will definitely take that period of time simply because the rollout of 5G is only now happening and that too is in pilot phases in a lot of different countries. The second part of your question on who is likely to lead it. I would say that places which are piloting 5G today are the ones which are most likely to be the leaders in the applications of 5G. That is a). And b), 5G in general requires a tremendous amount of CAPEX and therefore the return on CAPEX from a consumer and



B2B business has to be there and therefore the countries which are investing now and whereas there is an ability to give return on the CAPEX over a period of time from consumer and B2B are likely to be the people who are going to lead this and therefore if I take the US or if I take the UK, Japan, Australia, Korea, those are some of the places which are going to lead it to my mind.

Viju George: You did mention a \$10 billion opportunity potentially accrue to the industry over the next few years. If I have to split this between the telco side and the broader industry side, would you say that a very meaningful portion accrues from the industry as well as on this and that is a big difference between 4G and 5G?

Milan Rao: Yes, I would, at the same time I would say that the amount of downstream which is going to happen as a result of 5G is possibly going to be far larger than the downstream which happened as a result of 4G because the number of industry applications on the 4G were actually unstable and that stability is going to happen with 5G side. I believe the downstream is going to be much bigger in 5G that it was in 4G.

Viju George: And that is built in your \$10 billion estimation, Milan?

Milan Rao: Yes.

Viju George: How would 4G be compared with this, I mean, you have any sense, when it finally played out?

Milan Rao: I would definitely say it is smaller fraction. It is not in the same league as 5G would be. I was just saying that the tenor of time and 4G was also relatively smaller from a deployment perspective. I think in 5G it is also going to be a slightly larger one.

Moderator: Thank you. The next question is from the line of Ravi Menon from Elara Capital. Please go ahead.



Ravi Menon: I had a question about the fact that you are using, I think you are now pretty aligned with any of the network providers particularly that you have chosen a service provider agnostic kind of stance compared to one of your competitors who has taken a punt on investing in AltioStar. What do you think of the advantage or disadvantage?

Milan Rao: Firstly I believe that the opportunities which are going to be afforded by 5G are going to be stupendous and therefore we believe that relatively agnostic version would be the right one. It does not go to say that we are not partnering, we are partnering with everybody to that extent. But I think relatively agnostic versions going to be better. The second one is there is a number of use cases in 5G which are going to come up or going to be tremendous and honestly we believe that it will require the power of the ecosystem to make sure that we are working with all of the industries, etc., in order to make that happen and therefore we believe that we need to partner more. Lastly, I think there is definitely a lot of people are working towards, if I take RAN as an example, there is a systemic move towards an open RAN concept and I think the belief of people is that if 5G is going to be that large, then any sort of coupon, ecosystem basis is going to be more beneficial for the industry overall, and that is our belief too and that is why we are kind of going with that kind of a policy.

Ravi Menon: Secondly, which industry do you think where the use cases show the most promise?

Milan Rao: I would say auto because the promise of autonomous driving and vehicle to everything connected car is tremendous. I would definitely say healthcare as well. I am just talking about non-DSP right now. I assume that is your question. I believe healthcare is going to be huge as well because the need of the hour is that two different places -- the first one is the inability of healthcare providers to provide to a large mass of people who do not return back to hospital, therefore the concept of remote care and home health is going to be huge. And the second is unfortunately care not available to people who do not have access to that. I think that is going to be a huge positive upside on the healthcare side. Just the



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access that it is going to provide to healthcare from billions of people who do not have access to quality healthcare.

Moderator: Thank you. Ladies and gentlemen, we will take the last question from the line of Ankur Rudra from CLSA. Please go ahead.

Ankur Rudra: First of all, Milan, is there a risk at all given how you have seen the trajectory of 5G so far versus previous cycle the 3G and 4G, that this would turn out to be much lower than expected and only replaces existing 4G CAPEX instead of creating a surge? And related to that, if there is a delay in the telecom CAPEX increase, can the enterprise adoption especially in areas such as private networks, factory automation, etc., happen independent of the telecom-led adoption?

Milan Rao: First one I would say is that the rapid pace of innovation that we are seeing right from the silicon suppliers to device manufacturers to networking equipment to telco, I think the amount of innovation and the amount of urgency which is being shown towards 5G is very-very high. So from the urgency perspective, I think there is a lot. You are right that depending on the amount of money that will be spent first on acquisition of spectrum and secondly on the deployment of 5G networks is going to take a period of time; however, I think the difference is going to be that 5G networks to my mind are going to be deployed in concentration and in patches. So there will be 5G networks which will be available in certain areas where there are likely to be very high propensity of application usage of 5G and so it will not develop as an overall uniform play around the world. So I think that is one difference and that I think is going to happen fairly rapidly. So from a deployment perspective, I think it is going to happen. If you are saying that is 5G deployment globally is going to happen? Yes, of course, that is going to take time. But I believe that the deployment of the network in the high density areas is going to be fairly rapid and we see a lot of movement towards that along with the use cases as well. The second part, I do not think it is necessarily predicated or reversed. I think that was going to happen anyway. There is an ability to have enterprise 5G networks that certain countries which have already



said that they are going to allow enterprise 5G networks to be set up by enterprises and we are speaking to a number of enterprises honestly who are interested in setting up those networks. So I think that is going to happen independently anyway. But I do not think it is going to happen because of a delay in the network infrastructure that is going to be done.

Ankur Rudra: What I meant was independent of whether the telecom adoption happens or not, there is not dependence from a silicon chip availability perspective for things to go that way?

Milan Rao: The enterprise 5G networks are going to happen and obviously if you look at distributed networks, distributed networks are dependent on the mobility networks being set up. But if it is a factory set up or a campus set up, that to my mind is going to happen faster.

Ankur Rudra: Given what you have seen so far, how much is there a way to distinguish what spend would be driven by especially if the opportunities for the companies that you mentioned earlier, how much is that would be on the industrial side versus telecom led side versus consumer devices side?

Milan Rao: Honestly, that is a little hard to answer right now but we do believe that they are like parallel tracks which are moving ahead. There is investment behind both the telecom service providers as well as the equipment providers as well as industry on the applications side and therefore we believe that the balance of just network access versus vertical applications is going to be higher in case of 5G for industry solutions. Are they all going to happen at the same pace? That is a slightly different question to answer but I think they are all moving fast at a fairly rapid pace.

Moderator: Thank you. Ladies and gentlemen, that was the last question. I now hand the conference over to the management for closing comments.



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Aparna Iyer: Thank you, all for joining the call. In case we missed a few questions because of time constraint, please feel free to drop in those questions to the IR team and we will have it responded back to you. Good night.

Milan Rao: Thank you.

Moderator: Thank you very much. Ladies and gentlemen, on behalf of Wipro, that concludes the conference. Thank you for joining us and you may now disconnect your lines.