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FUTURE SIGHT PODCAST

Ep. 35: Connecting the Future in Business with 5G

Future Sight Podcast by Capgemini Invent

As business and technology move forward at a rapid rate, it has become increasingly important to explore new ways to adapt and grow for the future. This podcast is your guide to that future journey.

Join us as we explore a new topic in business, technology, and transformation. Find out more about the challenges businesses are facing today and what they can expect in the future. Listen to leading industry experts as they break down need-to-know, actionable approaches with strategic insights and provide tangible takeaways.

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Episode Transcript

Liz Lugnier: This is Future Sight – a show from Capgemini Invent. I'm Liz Lugnier. On this show, we explore new ways for you to adapt and grow for the future of business.

In today's world, 4G mobile infrastructure and fiber broadband have revolutionized the way businesses and individuals connect to each other. In the past two years, 5G has pushed businesses even further into the future with multitudes of applications and industries.

But what can 5G do for you now, and in the future?

Joining me today to explore this are experts from here at Capgemini.

Pierre Fortier: Hello, everyone. My name is Pierre Fortier, and I'm a VP at Invent in charge of 5G.

Liz Lugnier: And…

Fotis Karonis: My name is Fotis Karonis. I am the Capgemini group lead for 5G and Edge.

Liz Lugnier: And from Ericsson…

Nadine Allen: I'm Nadine Allen, and I am responsible for Ericsson's business in enterprise in Southeast Asia, India, and Oceania.

Liz Lugnier: So, first let's establish the state of play as it stands. We've seen 4G reshaped connectivity, driving massive innovation with new consumer experiences, apps, immersive CX, device form factors. How is 5G set to revolutionize key industries such as HC, manufacturing, and the automotive industry?

Let's start with you Nadine.

Nadine Allen: We see a lot of interest in 5G from enterprise CIOs, particularly when we compare with previous cellular generations. So, I'm sure you've heard before the expression that it is not just another G and it really is about driving a much broader transformation in business and enterprise.

I think IT decision makers cite 5G as an enabler for their industrial digital transformation. And we know that 5G comes at a really important time in that overall journey. As enterprises are really seeking to improve their outcomes in the face of a lot of competitive pressure, where several industries are pressured to digitalize by structural changes such as sustainability, which is driving a need for new solutions and ways of working in many industries.

We also see a structural shift by e-commerce, which is forcing traditional stores into digitalization as well as pushing them to find new ways to retain customers.

And shifting expectations. I think consumers have already through existing technologies been exposed to well-designed user experiences in their professional context; they often see a data design and a poor interface in comparison to the consumer experiences that they've seen.

So, it's pushing both B2B and B2C to enterprises to modernize their user experience. And I think these expectations are pushing enterprises to become more digital, not only in their customer experience, but also internally to offer a more attractive working environment. And we see that 5G really can start to offer a lot in the context of this transformation that enterprises are undergoing, particularly in the area of agility, but maybe I can come back to that.

Liz Lugnier: Excellent. Pierre, do you have a comment there?

Pierre Fortier: Yeah, I agree with what you just said Nadine, and that 5G opens a new wave of possibilities across so many different sectors. And to the point you made Liz when introducing the question, let's think about… Let's step back and think about 4G. 4G,10 years ago, completely revolutionized the way we live today. It really took to the next level the use of mobile data.

Without 4G, we wouldn't have all of those social media that have completely exploded, and we wouldn't have all of those enterprise apps that have shaped the world we live in. So, let's see what's the technology unfolds, it certainly opens new possibilities from a technical standpoint.

And now it's up to the markets, both in B2C and B2B2X, to offer those new opportunities. It's also fascinating to see how fast the networks are being rolled out with. Already, I think, more than 200 commercial 5G networks that have been launched by operators across the globe; already 500 million subscribers to 5G services.

So, it's a very interesting start to this technology, but I think we're only seeing the beginning of how 5G will transform the world of connectivity.

Liz Lugnier: Excellent. And Fotis, I know that Nadine mentioned about the customer experience. Can you talk a little bit about the industry experience that 5G will make an impact with?

Fotis Karonis: Absolutely. 5G was, if I may call it, based on the 4G evolution to service, revolutionize the industry digital transformation, so it's just amazing. The steppingstone of 4G into 5G, and 5G brings a lot of new features that were needed by the industries as we sold these new customer experiences that Nadine and Pierre were talking about with 4G.

So, the fact that in automation, if you like in fixed environments, like supervisory control and data acquisition in manufacturing requires a few milliseconds of reaction times in order to get stuff done. The reliability, the security – these are elements that have come into the wireless world now and revolutionize the way that the manufacturing is taking place.

So, the production shop floors are not fixed anymore. They cannot be fixed anymore. There was a lot of constraints in manufacturing by having fixed shop floors that equipment cannot move around. Then the new evolution of IOT that requires massive connectivity today in scattered systems and the fixed environment where everything is cable, you can only cable one IOT device to a cable.

Here we have wireless, you can connect, hundreds of IOT devices to a wireless network in a very industrial environment. So, the needs of evolution and transformation in manufacturing, in logistics, in ports, in airports is massive because of everything is really connected

And the fixed connections, although you can say that there could be reliable, but they cannot have any scalability and flexibility to the needs of the new industry. Well, so, this is an incredible opportunity for wireless and 5G to step up. And as Nadine and Pierre said, there's huge investments going on.

We are in the steppingstone of 2012, right? Up to 10 years ago when it happened in 4G and 2022, I think it is faster. The deployment of 5G is faster than the deployment of 4G. The devices are much more and so on. And therefore, that will go in and transform the industries themselves like, logistics, manufacturing, healthcare, energy, utilities, ports, airports, etc.

Liz Lugnier: So, let's continue down this particular path. I'm hearing you say why 5G and I'm hearing some about why 5G is relevant for business?

Can you tell me a little bit what is the current state of 5G implementation in the business, Nadine?

Nadine Allen: I guess just to repeat or to reinforce some of the things that the folks in Pierre have already said, 5G – what is it that 5G brings of interest to an enterprise? The first I really think is about that agility piece. A high-capacity wireless business is an agile business.

And in the past, I think enterprises have had the option of reliable, but less agile fixed connectivity or lower performance, wireless connectivity. And with 5G that they don't need to make that trade-off.

So, whether enterprises need to optimize their operations, to increase up-time, asset utilization, and minimize waste and consumption, or be market ready, and refresh their products or launch new services rapidly or reconfigure their workspaces or their workforces to adapt to changing business requirements, I think cellular really gives that flexibility to change at speed and to gain new efficiencies at scale.

I think there's also new capabilities coming through in advanced operations. So, monitoring of assets, systems and data in real time gives improved situational awareness, a better end-to-end supply chain transparency.

And then the third area that I would probably talk about in terms of the benefit is around having a more holistic view of the enterprise and the data across all environments, both internal and external. We should mention mobility at this point, of course, being an obvious key element of 5G and the strength of 5G. But being able to combine all of these data points will allow us to develop deeper, more actionable insights and improve quality and speed of decisions as well as to drive better outcomes with regards to customers and customer experience.

I think when it comes to where are we at right now? Of course, 5G for enterprise, there are different deployment options, as 5G early adopter industries, such as manufacturing and mining, the energy sector ports, for example, you know, we're focusing on private cellular both 4G and or 4G and 5G.

And we're also seeing service industries such as retail and healthcare leveraging 5G wireless one capabilities. I think we have a number of private 5G networks that are operational globally, around 50. And of course, there are many more than that in trial and deployment.

And then the next phase will be in network slicing, which would of course be a key enabler for unlocking 5G opportunities. And we see that arrival with 5G SA with the core and SA NR…And I think, again, this is going to be a key area for us developing new innovation in 5G. And we're just starting to see a number of those deployments, essay deployments globally now.

Pierre Fortier: Yeah, I think I agree with you, Nadine. When we think about 5G or when we read marketing material around 5G, we read all of the promises that you just talked about – the combination of mobility and high quality. And private networks offer a kind of deployment that allows to reach that level of flexibility and mobility and high-quality in a given setup. So around, for example, an industrial campus, that's available now, and that's very transformative for industries like big logistics platform, airports, sports, manufacturing minds, etc.

Now to reach this level of problems, within the public network, it's going to be a journey. It's a journey because the public network operators have to roll out the 5G antennas in spectrum, widely across the countries. They then need to also run out edge computing data centers in order to bring the compute closer to the end user and bring the low latency promise all the way down to the end user.

And they also need something that Nadine mentioned, which is the 5G SA. So, a transformation of the core network that will really completely transform the way they can provision and deliver services to the end users. So, it's a journey. Private network offers great possibilities already starting now.

And we're progressively moving from a pilot phase towards a more industrial implementation of private networks across the globe. And when it comes to the public network, it's going to be a bit more progressive. We're going to see a next iteration in the next two years of the type of innovative network services that the public network operators can provide.

Liz Lugnier: Fotis, we're hearing from Pierre, some of the journey that we're going to be taking with 5G, as far as the network rollout is concerned. What do you think that some of the issues that 5G is facing, what are the roadblocks in the way?

Fotis Karonis: Just before, I would say I would call it the roadblocks, but also the opportunity, if I may say. Because there were roadblocks in when we seeing manufacturing, for example, or you know, the industries, right? They were the IT systems that we're working on their own. There are the operational systems working on their own and doing supervisory control and data acquisition on the shop floor.

And then there is the network part, which was segregated between different types of locations, different technologies, etc. And all these were, I would call it blocking a little bit that transformation of what we can actually do.

With 5G coming here now, we are bringing together the worlds of IT. Let's say the back-office systems, with data analytics, with SAP, logistics, planning, all that stuff. And then the operational part of the shop floor, which was very closed, based on PLCs, remote terminal units, scattered wired environments, very proprietary, and that were very difficult to change.

So, they were going on for years and years. And you can't really change the flexibility, the agility that Nadine was talking about. And then the networks were again different between the office, the outside, the inside, etc. It's different protocols. And the opportunity with 5G is that because it's IP-based, everything can come together, and we can actually have a holistic view of an enterprise, right?

What is going on the shop floor, linking it with the data analytics, with what is going on in planning and the logistics, the sub-contractors, the environment, and then looking at the network, which is very reliable wireless with all the agility that it can bring and connecting the office, the front office, the back office, the shop floors, etc., together.

And that is coming together with cloud, data analytics, IOT, AI, etc. So that's the unblock, if I may call it that enables this new world to happen. And to say now, what are the current, to go back to your question, I think it's also educational. It's a cultural element because these three worlds were working separately.

So, our job I would call it is to work with the stakeholders in the industries to understand how unlocking these capabilities by bringing all these use cases to collaborate, is a very important part. And that requires experimentation. It requires proof of concepts. It requires co-innovation between different partners because it's an ecosystem.

If you want to maximize the value of a data-driven economy or a data-driven enterprise, it has to do with an ecosystem play. And I think we've been working separately as telco operators, system integrators, network equipment providers sometimes. And that, I think is the opportunity now to come to together, to unlock and unleash the value of 5G, but also together with all the other technologies and business outcomes that are very important at the moment.

Liz Lugnier: Very interesting. You mentioned some of these use cases. Can you guys give me… Nadine, how about we start with you? Why don't you give us some use cases of some of the problems that we're trying to resolve today with 5G?

Nadine Allen: Yeah. I think, a lot of the key ones that we're really looking at, if we look at manufacturing segment, for example, is to have a better understanding of the environment. So, we're seeing digital twins, for example, where we are creating a virtual copy of the facility, allowing us to change operations, plan scenarios, test new environments without physically changing anything.

I think asset condition monitoring is really important. Collecting data from machinery, and alerting operators when maintenance is needed, which of course results in less unplanned downtime. And also, the costs. The costly replacement of parts, autonomous mobile robots, offers the most value I would say, or offers really significant value.

AMRs maneuvering around factory floor, carrying tracing and inspecting products and parts, and really, that flexibility, to be able to reconfigure environments based on that.

Augmented reality increasing productivity and accuracy by providing really good visual instructions and overlays and eliminating the need to move back and forth between the manual and the equipment. So really chaining and up-skilling workforce is through the use of AR. And then also, similar to autonomous mobile robots as well. So, you know, things like collaborative robots, helping operators to perform tasks like drilling, assembly and inspection.

So those are some of the early things we're seeing. And then of course, we're also seeing mining environments being very much benefited by cellular technology, not only improving business outcomes, but also really producing safety outcomes for them as well.

Pierre Fortier: To me, what 5G brings is really the real time and hence, situation awareness. So, whether it's in the shop floor, like Nadine just explained – the ability to collect data from different sensors, employees, machines, et cetera, and do something with that data and be able to act very quickly either because there's a risk situation or to enhance the quality of a product.

So, if you take, for example, real time quality control on the manufacturing process, that's really what the kind of failure that 5G brings.

But the same applies to different contexts. If you take public safety, which is a topic close to my heart these days. What 5G can bring in the situation of crisis, think about a major accident. What 5G can bring is the ability for the first responders to share information really easily share information, access video feeds from drones, for example. Create close groups of users in order to deal more efficiently with the situation.

And if we take this, enhance situation awareness to another topic, which is autonomous mobility, that's also equally important. If you have a major a traffic intersection and you're able to collect the data from different vehicles, from cameras, from sensors, that will understand what the situation is and be able to identify a risk because there's a, like a pedestrian that's crossing the street outside of the crosswalk or something dangerous happens behind a truck.

And the ability to collect this information, analyze it somewhere close at the edge, send the insights, and action points to the cars, for example, that can save lives, that can increase the safety of the road. And that can pave the way for new use cases. So, these are some interesting examples of what 5G can bring.

Fotis Karonis: Building on that, what Pierre just said about the automotive, I think we can imagine the combination of 5G in the 5G and edge. Actually, the edge, we should see it as a very important part that it provides that low latency capability computing that, a cloud hanging low, right?

Not only on the public, on the sort of public cloud, but also on the real edge. The importance of MEC, I would call it, versus the cloud edge is very fundamental because what we can think about the multi-access edge computing, is that if you can imagine the car that is, writing a new to Pierre's point, exchanging information it actually enables the car to move and to roam between, not only in the country, but from country to country.

So that the activity of that or the identity of the car is actually transferred via the mobile provider in exchanging roaming between as we are doing in devices, when we change the country, the same thing can happen with an automotive. The importance of the MEC, of mobile edge computing is that it's got network aware capability.

5G is a huge transformative capability for the telco operators to become digital service providers. And 5G provides that fantastic steppingstone, to actually transform the way that the services that they provide as telco operators to our consumers and to the industries.

Liz Lugnier: Nadine, do you want to comment on that?

Nadine Allen: I guess the one thing I would probably add, a little bit about what do we need to do in order to be able to support the introduction of 5G into enterprise environments is, of course, enterprises are not going to introduce technology without a good reason. So, it has to be deployed within the context of their overall digital transformation objectives, and business objectives.

And I think they've obviously got to build a business case associated with 5G capabilities, including a clear roadmap, a rollout plan applications, and also how to migrate from existing environments, which is an area that needs, clear thoughts and more work. But for this to happen, I think we also, to build on what Fotis was saying about education. We need to give better support to enterprises in understanding the capabilities of 5G, but also how 5G can be optimized alongside other frontier technologies.

And I think that enterprises obviously really want to improve efficiency. That's absolutely clear. But I think that, it's also important that we look into supporting how all of this evolution can support cross sector partnerships. For example, we talked about B2B2X earlier as a new evolving business model, to support enterprises and operators actually to deliver better, faster products and services. So, I think that piece around how 5G is optimized alongside other frontier technologies is also quite key for us to continue to work on. And then the broader ecosystem piece, devices and bringing ecosystem partnerships that can really make sure that these things work together end-to-end is also really quite key.

Liz Lugnier: What about new areas of business like sustainability? Fotis, how can 5G potentially impact sustainability?

Fotis Karonis: Yeah. I think it's a very fantastic question. And I think the, when we are in this sort of milestone, I would say that 5G is industrialized. What I think the opportunity is to say, what are the huge problems that the society is facing? What are the big problems that we are trying to resolve that haven't been resolved for ages?

There's two big ones that I think – one being sustainability, the other one healthcare. If we look at the problems of, for example, in healthcare where, we lived through the pandemic the processes have not been changed for, the last 60, 70 years.

So, I want to call it that as well, but on sustainability, there is a massive need, right? When we say reduction of carbon footprint – agriculture to make the products much more sustainable, much more eco-friendly avoiding that mass over fertilization, over usage of our resources.

Today, yes, technology and IOT information. It's all about information and having the right information to do the right use cases in an agricultural environment that we are, overusing fertilizers we could actually have a real-time monitoring using our 5G network, either on a private network or in a public network gathering information for a better water processing, better cleaning our rivers, cleaning our earth, less pollution, less carbon, all that is very possible.

If you look at all the different industries that are involved, we're talking about agriculture, energy, utilities, the chemicals there's a lot of efficiencies that there and use cases are just the tip of the iceberg of what we can think, or traffic management or transportation. The importance of using real time information on the fly, on the move, is absolutely important.

The other part is that the networks themselves. If you look at the amount of assets that have been invested and accumulated over the last century, I would say just thinking about the fixed infrastructure sitting there in big data centers, consuming a lot of energy because you have maybe 10 users, but you need to have the same energy to feed those big sort of switching centers.

So, we need to switch off. This industry cannot accumulate legacy, so we need to use this opportunity of building wireless networks, which are, I would call it comparatively to the technology that we're using consume less energy than, I don't know, 3G or the fixed line or even 4G.

So that is an important part of reusing our resources in a way of our infrastructure to consume less energy, switch off the old systems, move people on modern technology, local, low energy usage. And then of course, using the 5G as a technology for a better environment.

I will also stay a little bit on the on the healthcare. Because with healthcare, we are trying to make people be treated where they are rather than moving them into the emergency services. So that's sort of like vicious circle of – I am referring a person to go them to be referred to an expert or sending him to the hospital because we don't know what he has.

We can use remote working, remote assistance, "see what I see" applications, what the big promise of telemedicine that never happened in the nineties because the technology was not mature enough to do a medical class diagnostic from a remote location. Today, it's completely possible.

And together with technologies like cloud, data analytics, it's security also, you can absolutely do a multi-person diagnostic and have a really great outcome rather than moving people in and making them actually worse when they come out.

So, the importance of technology for a sense of purpose. I would call it human-centric 5G or human centric technologies. How do you use that in order to create a better world? I think this should be the big topics of today in the future.

Liz Lugnier: I think that's fascinating. I think that is a great thought there. One of the ways that I can see 5G impacting sustainability is that it's been really empowering the new reality of remote working. So, Nadine, can you give us some examples of how you see it influencing our future in the workplace?

Nadine Allen: Yeah, absolutely. I really do think that the pandemic, of course, has shown the value of a world or a society that is capable of working and studying from home or from anywhere. And undoubtedly, some of the learnings are for sure going to create a more flexible hybrid future for work. And I should also add education.

So, when Fotis talks about health transformation, I think one of the other big areas that has been forced to transform and I hope will continue to transform, will be in the education sector as well. And we need to make sure that the capability that we have at home and in remote workplaces or like those that we have in our regular workplaces. I think 5G for sure can really support in becoming, the go-to connectivity option for personal productivity across all devices that we use, and really to bridge the gaps in fiber-based fixed broadband.

And there are a number of issues in broadband deployment in different parts around the world. So fixed wireless access, for example, is a key category of use in 5G. And I really do think flexibility of 5G is going to become ever more relevant in a hybrid model as highly reliable connectivity will be needed, but it will not only be needed, but it will also be needed in a very agile way, because we're all going to start to move around a bit more. There's not going to be the same predictable patterns. The usage in offices will change. And people will start to work from places that they considered to be convenient for them, not convenient for organizations.

So, I really do think that agility that we talked about earlier will have a big role to play in the hybrid work model of the future.

Liz Lugnier: Excellent. Pierre, do you have any thoughts?

Pierre Fortier: I think 5G could play a key role in the next generation of digital workplace or work collaboration. And to Nadine's point, I think the pandemic really showed us the value of being able to connecting people from afar. And I think what's 5G can bring is helping to project expertise.

So, without necessarily having the experts onsite, you can still benefit from the support from an expert in real-time, whether it's for assisted surgery or whether it's in the manufacturing space, for example. I like the example of what Lufthansa Technik did. For example, in Hamburg, during the pandemic, they were one of the early adopters of a private 5G network for their maintenance center in Hamburg.

And the fact that they had this seamless high-speed connectivity within their maintenance warehouse truly helped them to maintain the activity at a time where obviously their airline customers were not able to travel. So, by simply using the seamless of 5G connectivity and the livestreaming functions of smartphones, they were able to be in real-time interactions with customers that could validate from wherever they were in the world.

Some of the maintenance operations that were being done onsite, and what Lufthansa Technik said was that had they not had 5G and this quality of seamless connectivity probably there's a lot of those maintenance operations that they would not have been able to do.

So, I think it's a good testimony of the value of 5G and this ability to bring expertise closer. Maybe one of the points I want to make on this topic of collaboration – two, three years from now when 5G network slicing will be quite installed and will offer new propositions, I believe we will see new services that will bundle an application with a certain quality of service on the network.

So, you can think about we're using all of those services, whether they are like Microsoft teams or and others. I would really not be surprised that in a couple of years we can have those services bundled with a specific quality on the mobile network. As employers will want to make sure that their employees can access specific applications and services with the right quality of service on the connectivity.

Liz Lugnier: That's really interesting. Fotis, do you have any thoughts on this?

Fotis Karonis: Definitely, there are three industries that are significantly driving evolution and progress. One is, I would call it the semiconductor industry and the way that it's just, this ubiquitous connectivity and capabilities that everything will be connected. And that is… it's going to be natively 5G. It's not quite there yet, but it's on its way.

The second one is the telco industry, of course, and the big divide, the deployments around 5G and the infrastructure.

And I would call the third one being the software. What is very to the points that were made earlier, especially now, Pierre mentioned about the software and the applications.

I think it's no secret that software is becoming cloud native. And I think that is a very important revolution of microservices. The way that the software is developed today for applications, it's the same way that it's developed also for the telco industry. So, when we're doing like a 5G core, it's also microservices-based.

It's cloud native. You can reconstruct the use cases and work on any sort of cross whatever hyperscaler type of environment. So, you can actually call these applications on your private network, or you can call them on the public network. You can have them on the cloud. You can have them locally on a mobile edge computing in an industrial scale – that provides a lot of flexibility for companies that are distributed across many locations, like in having logistics or in manufacturing, or you mentioned the aeronautical, or in automotive; that is very helpful so that you can have the same type of experiences and people can log in from different locations.

So that is the big opportunity I think here, and we are in the journey now that 5G. If I call the three layers, one is the connectivity, so huge investment. A lot of investments in building the connectivity. The second layer, I would call it is the data platform. So, we need the data platforms. We need platforms that they can use the data extracted from the processes using the telco, that tender communication infrastructure. And then the third one is the marketplace of applications. And I think there is a revolution there going on in each level, but the marketplace would be based on cloud-native applications. You can run it from, on the device, on prem, near the network or from the cloud, depending on the features and the latency that you would require.

So that's the I would say a model that is becoming the standard and we saw already from the consumer perspective a lot of customer experience changes already and coming into the industry now.

Liz Lugnier: I think that's fascinating. Particularly around the app store. A quick question though. So, Nadine, how do you think 5G can be a scalable solution in business?

Nadine Allen: Well, I think, we are really starting to see… We talked about 5G earlier as more than just a cellular technology. I think we need to see it as being a platform for innovation. So, it really can be a technology that is capable of operating across multiple environments, both indoor and outdoor, internal, external, and also working with a variety of different inputs.

All the things that collect data within organizations. We are starting to really see 5G maturity now around the world. I think Pierre referenced very high number of global deployments that we have now seen globally. We still have some way to go with 5G spectrum deployments and 5G network builder, but it is starting to become, a reliable technology.

And then I think all of the great capabilities that Fotis referenced with regards to essay introduction, microservices and so on. We are also starting to see that those kinds of capabilities will be scalable because you can connect, for example, a single 5G device to multiple different network slices.

So, I think these innovations are also considering how you become scalable across the broader ecosystem as well as offering all of these new capabilities in terms of latency; overall performance for end users, but also the ability to rapidly launch and configure new services and scale them if they're successful.

Liz Lugnier: So, playing devil's advocate – what about the areas around the globe that don't even have 4G: how are we making sure that nobody gets left behind?

Pierre Fortier: I think it's a very important question, and one that is not going to be resolved very, very quickly the. For sure, even in those countries, it's not magic. It's not going to become a ubiquitous. I think that private networks are a way to solve part of the problem, especially if 5G is combined with fiber backhaul or even satellites connectivity.

It becomes progressively possible to create those islands of 5G coverage in remote areas. Those can be mines. There can be big farms and they can be in remote locations. It's now possible. And then that means that across those areas, it's possible to benefit from a very high-quality connectivity solutions that will remain islands of operations with a premium 5G connectivity.

Then the question becomes apart from those islands where enterprises will find ROI in rolling out this type of infrastructure. How will the rest of the globe access this technology? I think it's going to take for sure, it's going to take a little while.

The variety of use cases that 5G can cater can help because it means that it has the possibility to offer services, both to consumers, governments, smart cities, etc. as well as agriculture and so many different sectors.

So, that means that hopefully the ROI of rolling out this type of infrastructure will increase over time. But it will not be a battle that will be won overnight.

Nadine Allen: Maybe one thing I could just add to that. I agree with what Pierre has said, but also, we shouldn't forget that 4G today can do a lot already. And there are a number of 4G private networks around the world. So, I think we can for sure start with 4G, but you raise an important point, Liz, and that is that, of course it's really important for governments to really see that 5G and similar capabilities are really now, critical national infrastructures.

And it's important to get organized around making them available for their own competitiveness, their own digital competitiveness. So, the third thing I would say is, I've been in Thailand now for five, six years and when I look at the performance of networks here, it's incredible. I have 150 MEC coming into my house. The fiber penetration here is really good. I think what they have done really well here is, leapfrogged a little bit and started to develop as much as they can or learn on other global experiences to make sure that when they did deploy, they really deployed very reliable connectivity solutions.

So as other countries start to come downstream or to come aboard with 5G, I think a lot of the earlier points that we discussed about making all of this a success and ensuring that all of this transformation happens, I think we will have a lot more learnings, 24 months from now. And I would really love to see some of some of these emerging economies really start to tap into them and capitalize on that learning.

Fotis Karonis: It's a super point. And I think that if we want to accelerate the evolution of that, of 4G and 5G, I think the online services, just to enable, to leapfrog and enable the government to transform of different countries in online services, to enable the consumers to do everything online, is a very important and incentive to accelerate the deployments of 4G and 5G networks. Because a lot of countries don't, not fiberized and if you really want to move to the digital economy, have a much more efficient running operation of a state, all these different services can be accelerated by being online and digital.

So that pushes, the deployment of 4G and 5G. We have seen that in India, for example, everything online, etc. So that's drive side from a need side. The other one is at 4G and 5G networks are coming together. So, all these spectrum portfolios are blended.

So, when you launch a network, it really turns into a 5G network because all these different spectrum portfolios that countries had deployed on 4G – the 1800 or the 800, etc., 21, 26… And now of course, 3.5+ are encapsulated in the same technology.

So, by leapfrogging, you catch up with your deployments and I think, and the digital transformation of your country. So, it's a huge opportunity.

Liz Lugnier: Nadine, I want to come back to you, you touched on this, but how has the adoption and integration of 5G business in Asia really differed from Europe in the United States? And what lessons can we learn from its successes and where it might have overpromised and not delivered?

Nadine Allen: If I look at private networks, so if I take it from that perspective, I guess from a deployment perspective of private networks. We see a lot of traction in the US, in the UK, in Germany, France, China, and in Asia/APAC, we've seen Australia, Singapore, some deployments in those countries. From a general 5G availability perspective, there's a wide variety of countries in this part of the world, some of them have launched 5G, some are yet to launch 5G. So, we don't see quite the same level of blanket coverage as we might see in in the US and then some countries in Europe albeit we do in some countries like Australia, for example.

I think that the other big thing that's quite different between the US and some European countries is around the spectrum strategy. In the US and in Europe, we're starting to see spectrum allocated or dedicated to industry. And I think that to some extent is encouraging a little bit more activity.

I think the spectrum model is still emerging here. But at the moment, we're seeing less dedicated spectrum opening up. There are a couple of exceptions, and I think this is an important point for enterprises, actually. I think we need to develop a very clear, a reliable, understandable spectrum model for the enterprises.

We've recently, just very recently in the last week, seen India, for example, now proposing an investigating dedicated spectrum. So, there is definitely some interest in developing this, but I do think that makes a difference when we give a clear and easy to understand spectrum model.

And then industry relevance. The industries of course can be quite similar. Like manufacturing is quite a big deal in this part of the world. But I think in some cases, the maturity of the enterprises and the business challenges are not perceived to be the same. So, for example, labor costs in many countries in this part of the world is a lot lower.

So, there may seem to be not quite the same level of pressure to drive efficiency. But I think what becomes important there is to remind us that this transformation is not just linked to reducing labor cost; is to really improve the effectiveness all-around of an enterprise's outcomes.

And then I would say we are of course from an ecosystem collaboration perspective. Like in many other parts of the world, we need to mature a lot more than we already have done and do a lot further collaboration, but there have been a couple of really great examples.

And I've seen, one, if I could talk about is a case in Australia for a company called Taylor Construction. Where they've been really using 5G alongside existing 4G to do some really smart things like holographic building visualization, where they're using Microsoft's HoloLens to like this type of mixed reality smart glasses that their employees and customers can wear onsite to render like a virtual model of the building or elements of the construction process such as holographic, structural steel framing or electrical schematics.

And then they're also using one that I really thought was quite cool is IOT structural sensing. So, they're putting smart sensors of fixed to rebar and embedded in concrete aggregate. And they send they've received data back

via into the cloud. And this determines if the concrete has been poured correctly, attracts any shifting of the concrete for years to come.

And they're also interested now in looking at replacing their backup fiber line with 5G, gaining fiber like speeds with the diversity of a wireless connection. So, we are starting to see some good examples, but I really think clear spectrum model is very important. And I think it's important that they really look at the broader transformational potential of 5G.

And it's a peer technologies in supporting a wider transformation than focusing only on it.

Liz Lugnier: I'm going to go back to your example that you mentioned around the HoloLens. That's a great immersive experience, and we're seeing more and more brands also developing immersive experiences. So, Pierre, what role will 5G play in bringing some of these immersive experiences to the consumer?

Pierre Fortier: I think what 5G can bring to immersive experience is mobility and scale. Mobility, because today, if you have a good Wi-Fi connection and a good fiber connection behind your Wi-Fi, you can do virtual reality with a good experience. But obviously you will be limited to the area that's well covered over with Wi-Fi.

Now, if you think of 5G, especially combined with edge computing, you can extend those areas where those services can be consumed. So, for example, you would be able to have like big training centers. So that's people from different sectors can wear a VR headsets and be trained on different activities.

When you will have 5G and edge computing at scale, you can really imagine a multiplication of those use cases. For example, in tourism, you visit a big touristic site and you wear AR glasses and all of a sudden you would be able to access like a virtual tour guide, see additional information, images as you go through your visit of the site. And that can really enrich the experience that you have.

Liz Lugnier: I want to come back to what you were saying earlier about skills, Fotis. What kind of skills are we going to need to develop in order to move to more 5G uptake?

Fotis Karonis: I think it's a big need, as the skills of software, especially software, we talked about immersive reality, we talked about augmented reality. All that, this is around AI, data analytics, all these different technologies.

First of all, enable the use cases to happen. It's not like one separate from the other. And that's where the skills around software development, but also industry skills. On the one hand, we have the consumers that require things. These applications, maybe they starting from the consumer, but they quickly going into the enterprise.

We talk about the metaverse, AR, VR all these applications, right? They started from a marketplace of applications from a consumer, but they quickly become part of an industry like predictive maintenance, analytics, or remote diagnostics, etc.

What that enables is: how do we unlock that? How do we, because 5G gives you all these examples, right? At the end of the day, we need to create the applications that are industry grade, career grade, medical grade, all that stuff. And I think that is a combination of skills that are related to software on the one hand, but also industry-specific. So, I think the blending of the two I would call it, provide that digital revolution or the digital transformation would be starting, that we started today, the discussion about how to create outcomes.

And the difference between what was happening, a few years back or now even, when we had IT separate to the operational environment where the shop floor was not linked to the IT. And then the network was a completely different science, etc. Now, with 5G, you need 5G features to enable these applications to thrive, let's say. Because if you don't have the features of low latency or if it's data agnostic or network agnostic, you won't be able to manage, you won't be able to materialize. You won't be able to deploy these applications or connect the devices to the applications that create that unique ecosystem end-to-end experience.

So, I think that the evolution of the skills is to match software development with industry specifics and network specific information, create something like a new type of science that enabled to industrialize these types of use cases.

And I think by pushing the skills of software, it's on the shop floor, on the real time where mobility plays a role. It's fascinating. It's just fascinating because the world is in continuous motion. And nothing is static as our, one of our, ancient Greek philosophers said, “Everything flows”, right?

It's nothing's changed and nothing stays still. And therefore, the world is mobility. It is about creating the customer experiences that we don't even know what we need, but as soon as they come out, they become really fascinating, and everybody engages to that.

Liz Lugnier: In the vein of nothing changes, but nothing stands still at the same time – Nadine, what do you think the next two years look like for 5G in business?

Nadine Allen: I think we're at a really exciting point because. We are seeing a lot of interest. Cradle Point and IDG commissioned some research, not so long ago. I think 2020, and 80% of IT decision makers really felt that 5G was relevant to their overall digital transformation and supporting new capabilities using AR/VR and so on. So, I think the interest really is there.

I think there's going to be a gradual maturity in ecosystem and partnerships. I think more different types of organizations are going to come together to really make this happen and think about how to deliver outcomes in the end-to-end. I think there's going to be more increased awareness of 5G within enterprise.

I think as digital maturity increases, 5G will become more important. And we've talked about values like reliability, privacy, security, and things like functions like network slicing and precise positioning. And these are all individual kind of capabilities. I think what we've got to work on now is that, and what will be what will evolve is that 5G will be seen as a platform with a broader sets of capabilities, not just a new network generation with higher speed and lower latency.

I think we'll definitely see more private deployments. We're already seeing them happening now. So, I expect that that will just grow and develop. And I really hope that governments will encourage that. So, I hope that we will see more government grants, really pushing and driving for introduction of 5G, and related technologies and being seen as critical national infrastructure.

I hope and I really do believe that 5G spectrum will be, of course, deployed more universally, but more importantly, that we will see clearer strategies around enterprise spectrum and how that will be managed. And then of course, I think we'll see more devices coming on board. There'll be factory fit for 5G. We'll have a better solutions in terms of the ability for the device ecosystem to work with these new technologies.

Then I think in a second wave, we will see the commercialization of slicing, which of course will be accelerated by more 5G essay deployments. And then I really believe that 5G will become the primary connectivity for large enterprises and the model of collaboration and orchestration in the ecosystem, including the role of system integrator actually, will have matured.

And then finally, I would say we will start to see many more disruptive business models, as-a-service models like B2B2X as we start to see more interesting partnerships develop across different industries.

Liz Lugnier: Excellent. Thanks. So, Pierre just following on that, do you think it's too soon to be talking about 6G or should we already be preparing for this revolution too?

Pierre Fortier: That's a hard question. I think we haven't seen everything that 5G has to offer. And only one month ago, there was a new release, which was a frozen – release 17 of 5G, which will bring, in the next, let's say 12 to 18 months, a whole new set of features that will enhance even more what 5G can have to offer in terms of, for example, precise positioning integration with non-ferrous field networks like satellites. Or in terms of, this function called sitelink, which allows devices to connect to each other without the need of a network, which is a very important. For example, in the automotive industry, from a mobility or also in public safety, which we were talking about a little bit earlier.

So, I think we still have important steps with 5G. Maybe one point related to that, and to what Nadine just said, we were talking about slicing. Again, it's still very much ahead of us, and it's one thing for a telecom operators to be able to offer those new set of quality of service features in accessing their network. But something that's also very important will be for application developers to access those new features, seamlessly across different networks. If you're a developer and or if you're an enterprise and you develop a new service, which can benefit from those high quality of service network slice, you don't want to have to code your application or to sell your application differently, whether you're targeting an enterprise that's connected to operator A or operator B.

You want to have some, the same types of API, same time of engagement models with those ethical operators. So that's less of a technical feature, but still something that's absolutely fundamental for those types of services to be used at scale.

And so that's, again, something that's ahead of us. Now, when it comes to 6G, I think we're still very much in the R&D phase of 6G. And they would say that it's mostly important from a technology sovereignty point of view. We see lots of interests, for example, in the US for the technology.

Some say that they may be lagging behind a little bit at the time of 5G; R&D certainly don't want that to happen again with 6G. My understanding is that there's high investments in the US, in terms of R&D, to make sure that they position at the right level on 6G.

And I'm sure, maybe Nadine can comment on that, I'm sure, in Europe and Asia, a lot of the equipment providers are already actively working on the next phase of 6G.

Nadine Allen: Yeah. I think there's 6G standards, development of them is going to be mid-this decade. So, we're expecting 6G to arrive around 2030. But I think what's really important about 6G is we talked a bit earlier about immersive experience, which by the way, we talk a lot about 5G for business use and enterprise use, but we should not forget the consumer piece. Because I really do believe that the consumer experience is going to be much more transformed.

We're seeing a lot of these luxury brands now: Gucci have just launched or launched recently a Gucci Garden in Roblox, which is a gaming platform, and they had 90 million visitors here. Celine are doing the same. Dior are doing similar, Armani have done some interesting try on lipstick, virtual reality thing.

I think the world of fashion, beauty, everything will also be, very much transformed by these experiences and the relevance of 6G to all of those things is that I think 6G is obviously really going to build on five, but we'll also be very much about, this intertwining of physical and digital worlds.

We call it the internet of senses. I could be having a coffee with you guys now, and I'm smelling that coffee, or you could be eating cake and I can smell the cake, that kind of piece. So, something to look forward to. But I think we have a lot to do with 5G first to Pierre's point.

Liz Lugnier: That's absolutely fascinating. I would like for each of you to give a final thought before we go. So final thoughts, Nadine.

Nadine Allen: Yeah. For me, look, I think 5G is really exciting. Really, we are just at this really the start, I think of a lot of potential. We're really starting to see maturity and 5G deployed ubiquitously. And I think we need to leverage that to focus this point about talent. I think, we need to bring different kinds of people together to make this transformation happen.

And we talk about the ecosystem all the time. So, I will say that again, but I think for me, I really would love a combination of organizations to be challenged by enterprises to really support them in driving a really, a strong and compelling transformation using 5G and its peer technologies. So yeah, exciting times to come!

Pierre Fortier: I think we're seeing new waves of digital transformation. And more and more, what we see with our clients across all sectors is how connectivity is becoming strategic. It's very important. Without connectivity, you don't have access to data and digital, so you can't transform at least at the pace that is needed, whether you're talking about a change of paradigm and towards something more sustainable, or if you're looking for more efficiency and more innovation in the way the enterprise is running the business.

So, connectivity is becoming extremely important and 5G to that respect, is a true, is going to be a true game changer. In the sense that it can bring, again, the scale of the mobility, the quality of service that needed to power all of those connected devices to share seamlessly data across different systems with the right security and velocity.

So, I'm very confident that we'll see more and more use cases in the coming years, more and more enterprise moving from, early adoption pilots to really leveraging the power of 5G at scale.

Fotis Karonis: I think we should think about a sense of purpose that in this period of time where we need to be, sustainability, human-centric opportunities. I think we should see 5G as to unlock the potential of these type of use cases. There are some really critical problems that we are facing, and this is an opportunity that you know, information reliability can help us being a little bit more predictive, a little bit more efficient in the way we use our resources in the world and the better services we provide to people that are in need. I think these are areas of very high importance that networks and wireless connectivity 5G can help.

The second one is around connected products. I think we focus a lot on the infrastructure and how to make things happen, but I think the, what is important is what are those connected services? For, as products are leaving a manufacturing site and automotive, how do we make it more safe?

All these products are becoming more services and products. The box is much more smarter. It's fully connected, it's got data and so on. So, I think we need to privilege those low power applications where the device has become now a 5G, I would call it native, and enable that low power connectivity and the intelligence to be very discreet and very useful for us.

And the third one is about skills and education and enabling, helping those digital skills that every industry can transform to become much more sustainable. Much more leaner and move on into the sense of purpose that they do.

Liz Lugnier: It's obvious that the present and future of 5G connectivity is set to be the basis on which so many amazing new technologies and business opportunities will be built. I'd like to take a moment to thank all of today's guests, Fotis, Pierre, and Nadine.

If you enjoyed this episode, don't forget to subscribe on Apple Podcasts, Spotify, or wherever you get your podcasts. This has been Future Sight – a show from Capgemini invent. We'll see you soon.

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