

III Conference on Competition and Regulation in the Telecommunications Market

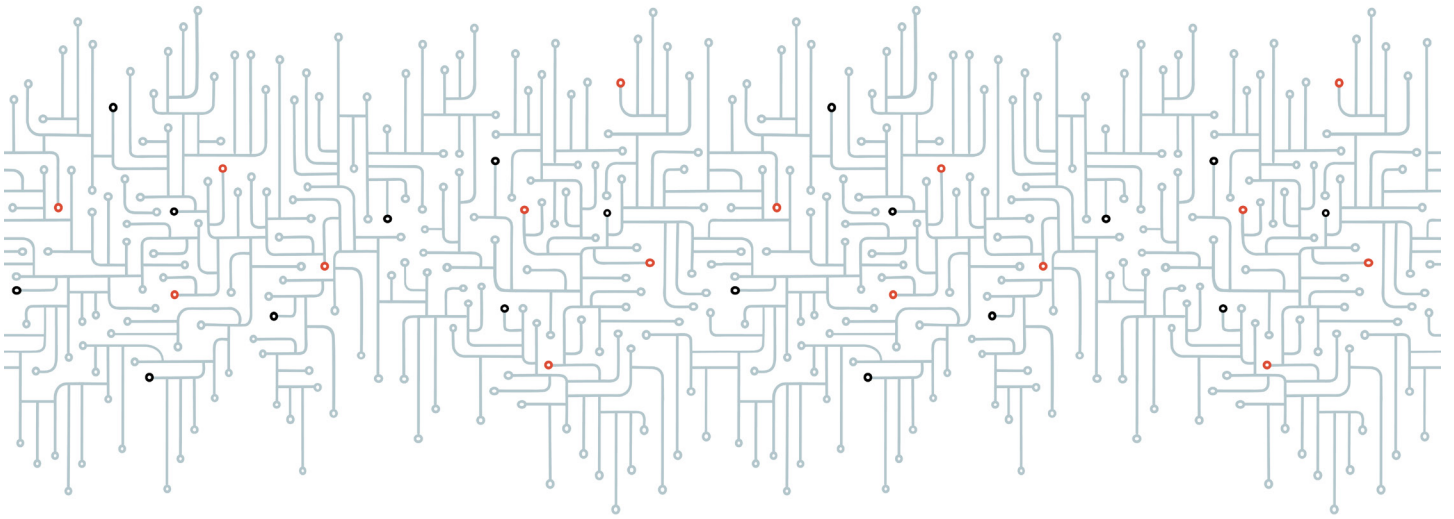
The Impact of 5G
on EU Competitiveness

Brussels, March 10, 2020



Public-Private
Sector Research
Center





Acknowledgements

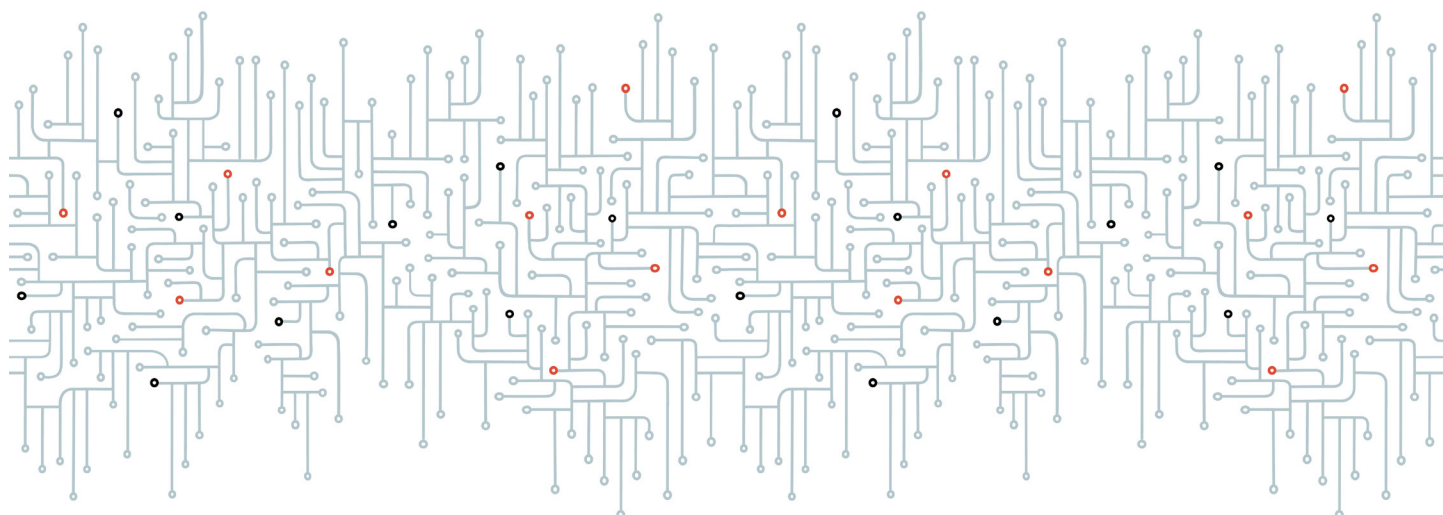
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1. Introduction

ANDREA RENDA

Senior Research Fellow and Head of Global Governance, Regulation, Innovation & Digital Economy. CEPS.

Today, we have a very interesting topic. This topic has been hidden in the news in past years: the fifth generation of mobile radio communications (5G) technology. It appears to be a game changer for wireless technology, the glue that will enable communications between cyber-physical objects. It not only improves our ability to communicate online, but also to organize that mysterious but certainly disruptive set of innovations that we normally subsume under the label “Internet of Things (IoT).”

5G technology also appears as a game changer from a competitive landscape perspective. If you go back two or three decades in the history of telecommunications development, and you might disagree with me but I am going to give my take on this, we are going through a period in which the development of infrastructure was something for which Europeans felt sort of an inferiority complex.

There were historical and structural reasons for this. While the US in the 1990s and 2000s could somehow afford, and I will qualify this verb in one minute, releasing and relaxing some of the regulatory requirements on infrastructure deployment to enable and boost innovation in what we know from 2002 to 2003 as the “regulatory holidays” or “regulatory forbearance” period, Europe was somehow locked into a situation in which the absence of alternative infrastructures led to putting together the member states with different conditions and forced stricter regulations from the very beginning.

This, to some extent, has created a lag in innovation and infrastructure in the EU. At the same time, it has preserved higher pluralism in the market. So if we want to take the structuralist view, Europe is more competitive in the sense of having had more players in the telecommunications space and infrastructure for many years.

This reverberated in a slightly different way on the wireless side. On the one side, the US could enjoy another advantage, which was the possibility of allocating spectrum throughout the territory of the country, and be able to run auctions and key frequency bands such as the SEM and the Megahertz band¹, almost a decade before the EU members were able to do it. So, the US got this first move advantage in the market size, which is really needed in order to deploy those technologies.

On the other side, Europe has remained prey of its richness and diversity if you wish, but also to some extent – and this is a little criticism of past EU policies that I think the Commission has shared largely since the early 2000s – has suffered from the impossibility to really coordinate and centralize, to some extent, the allocation of frequencies and spectrum throughout the territory of the EU.

Now, this is what happened before, but 5G comes as a gamechanger for many reasons because in the development and the deployment of infrastructure we have seen that this lack of pluralism in the market or the lack of players in the competition in the static sense has also generated a lack of competition in the dynamic efficiency sense of the word. Look at DG Competition, a typical terminology that you use on a daily basis. The lack of dynamic efficiency is something that the US authorities have recognized early on in the past few years.

¹The term SEM stands for Spectrum Emission Mask, which is generally intended to reduce adjacent-channel interference by limiting excessive radiation at frequencies beyond the necessary bandwidth.

Also, for example, when the US started looking at how to revise the net neutrality rules², because what they did was based on the understanding that at the infrastructure level, the choice for consumer, after years of lack of regulation had become much poorer. The consumers were facing a lack of competitive rivalry and dynamic efficiency that also resulted in a lack of investment in new technologies. The US has seen that also in the wireless side.

Nowadays, when we look at 5G, we probably see a situation that is unprecedented, where the US is almost nowhere in the picture of the standard essential patents for 5G³. We only have one company (Qualcomm), which is attributed with an estimated 8% of the overall standard essential patents on 5G. Whereas, EU companies – maybe as a result of this constant working on trying to get the governance right, and also from this fragmentation that was somehow imposed and that somehow resulted of our approach towards competition policy – ended up with an attributed 25% at least of the standard essential patents for 5G.

This means, and if you look inside the patent pool, that the EU is almost as big a player as China and Korea when it comes to 5G. So, for the first time in perhaps 25 years, the EU-US comparisons is not a story of the EU lagging behind, but perhaps a story of complementarity. I make no mystery of this. For the first time in years, entities have been approached by American scholars, American institutions – and this happened also recently to the European Commission on the connect side, I don't know if it happened also in the competition side – with attempts to convince the EU that there is complementarity and that maybe the US market could be open to EU players such as Nokia and Ericsson. This could also be done maybe on a reciprocity basis, especially if the EU recognizes that there are other areas of this ecosystem where the EU is not as well-positioned: the platforms complications, we call these areas the higher layers of the internet ecosystem. This means that maybe there is a way to integrate these two markets if the EU is a little bit more lenient in accommodating those platforms in Europe – still regulating them, as inevitably will happen – but at the same time, exploiting the chance of being able to connect the US through wireless technologies in 5G.

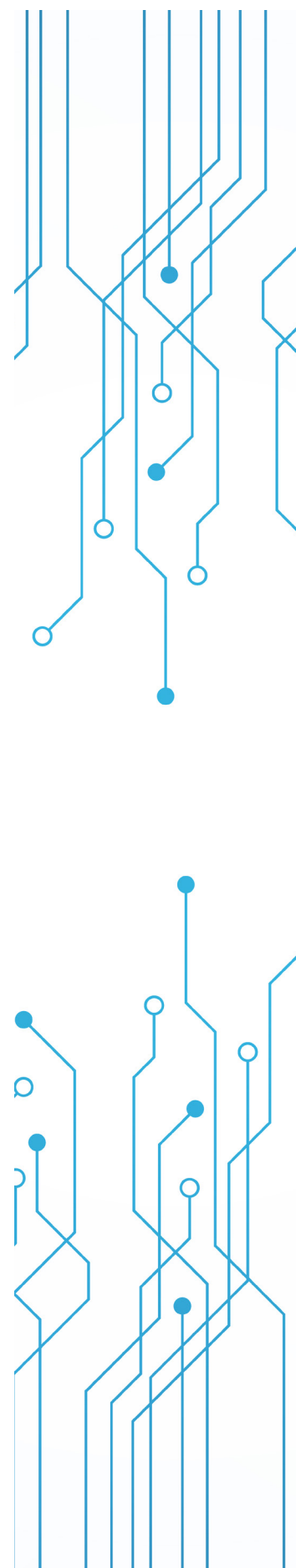
It is no mystery to the audience that there have been talks of US investment in Nokia recently. This is something that is relatively unprecedented and surprising, unless we look at these developments over time and realize that with all the formidable development of the digital economy in the US, there is a part where the US has been lagging behind, and this is exactly a part that the EU can provide.

Thus, in terms of external competitiveness, “getting 5G right in Europe” would mean potentially having an enormous market opportunity at this stage. So, how do we fix the 5G environment and market internally? That is, as always, a matter of governance. So, what might be discussed today is again, the usual story that is interpreted in different ways every time we get back to it, which is: How do we really create an integrated market for 5G at the EU level? How do we make sure that 5G finds fertile ground to develop in Europe, through an integrated market? It is through some forms of consolidation across boundaries, but not a lack of competition such as the one that the US generated in the early days in the physical infrastructure, which over time has generated, as I was saying before, bad results.

This means that pure industrial policy in the name of maximizing investment in the next two years in 5G is probably not something that Europe has to be looking to. Sticking with very static efficiencies, and thereby, access policy in the deployment of wireless communications would also not be an option as it might generate insufficient incentives to

² Net Neutrality is the principle in which net service providers have to treat all internet communication equally, without discriminating or charging differently on the basis of user, content, website, etc.

³ Standard essential patents or SEPs are those patents that any company will have to make use of when implementing standardized 5G technology.



invest. Fragmenting the market through uncoordinated allocation of spectrum is unlikely to be the solution for Europe and 5G. Not working on side technologies, such as the data that will be produced by things and the governance around them is probably also not the solution to create a conducive environment for a meaningful and fruitful deployment of 5G in Europe. So, there are many question marks as to what is the right recipe, which is why I think this conference today is so timely.

We have just witnessed also in this room, on the day of the presentation of the Digital Strategy for Europe, the discussion on data and the vision for the future of the digital policy at the EU level in this communication that European Commission adopted on February 19. Margarethe Vestager was here illustrating the main contents of that communication. And what we see is that the European Commission has a vision of technological sovereignty and a vision of self-sufficiency of the internet ecosystem in Europe. What we don't know is how we can get there and each and every of the strategic and essential ingredients of this very strategic and important recipe. So, the competitiveness side and the competition side, which are typically complementary and very separate, will be both, in my expectations, tackled in this important conference.

So it's an honor for me to kick-start this conference and to give the floor to Rita Wezenbeek, who is the head of the unit dealing with a very important part of DG competition, which is the telecoms part. This is a very important part also because telecommunication regulation, since the early days in Europe, has borrowed almost all its tools from the competition policy at the EU level, from significant market power, to market definitions, to some of the identification of the remedies. And the interplay between the ex-ante regulatory environment and the ex-post has been crucial and potentially a moving target. Over time, we might be expecting more moves, the more the technology accelerates and the more the European Commission finds good, agile ways to cope with it.

2. 5G and EU Competitiveness: The Balancing of Competition and Cooperation⁴

MS. RITA WEZENBEEK

Head of the Unit dealing with Antitrust/ Telecoms in DG Competition, European Commission

For the new digital era, the EU needs not just pro-competitive regulations but also fast networks. The awareness of this lies between the priority of the European Commission to stimulate capacity networks and specific rules of the new European Electronic Communications Code (EECC)⁵ to stimulate investment.

Competition significantly contributes to the competitiveness of the EU economy, enables growth, efficiency and stimulates innovation. Additionally, in the telecommunications sector, competition spurs investments: companies have incentives to upgrade networks and invest in new technology.

The lecture covered four topics. First, competition and cooperation in infrastructure deployment. Second, standardization in competition and cooperation, followed by a brief review of the horizontal guidelines⁶. Finally, vertical guidelines⁷ to keep downstream and upstream markets contestable and open.

Regarding competition and cooperation in fixed and mobile infrastructure development, there are new rules and codes such as co-investment rules, access to passive infrastructure, network sharing, national roaming, and others, that have a clearer recognition of companies with poor resources to ensure that these businesses remain viable. Also, a new stream of business models and codes is now compatible with enhanced roll out and competitive prices objectives.

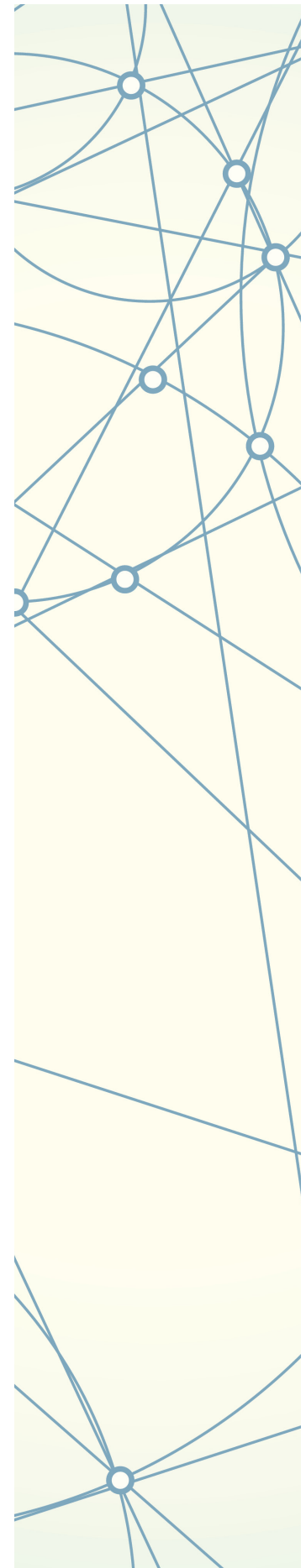
From the competition perspective, cooperation between operators may lead to situations that might reduce incentives to invest and innovate. In this sense, the importance of ensuring competition remains unchanged and companies should be aware of that before they develop any infrastructure in place. In the telecoms sector, competition rules supplement the legislative framework. They work hand-in-hand and companies need to comply with both. Thus, depending on the nature of the problem in the market, competition or regulatory solutions may apply. In this sense, regulators occupy the “driving seat” with the new rules, e.g. the co-investment rule, market tests assessments or issues where it is to be analyzed if a proposal for cooperation meets the needs of the market. On the other hand, competition authorities always need to carefully assess whether their intervention would contribute.

⁴ Summary prepared by the PPSRC concerning a general and not literal reflection on Ms. Rita Wezenbeek's presentation. Ms. Wezenbeek spoke in personal capacity thus the views expressed were purely those of the speaker and do not necessarily reflect the views of the European Commission.

⁵ The EECC is a European Commission directive, which regulates electronic communications networks and services. Adopted in 2018, it states that by 2020 the member states must adapt their telecommunications regulations in accordance with the EECC.

⁶ The guidelines to horizontal cooperation agreement set out the principles for assessment under Article 101 of the Treaty on the Functioning of the European Union of agreements between undertakings, decisions by associations of undertakings and concerted practices pertaining to horizontal cooperation. Cooperation is of a “horizontal nature” if an agreement is entered into between actual or potential competitors. In addition, these guidelines also cover horizontal cooperation agreements between non-competitors, for example, between two companies active in the same product markets but in different geographic markets without being potential competitors (European Commission).

⁷ The vertical set out the principles for the assessment of vertical agreements under Article 101 of the Treaty on the Functioning of the European Union. Article 1(1)(a) of the Block Exemption Regulation defines a “vertical agreement” as “an agreement or concerted practice entered into between two or more undertakings each of which operates, for the purposes of the agreement or the concerted practice, at a different level of the production or distribution chain, and relating to the conditions under which the parties may purchase, sell or resell certain goods or services.”



The guidelines for horizontal agreement act as a framework for cooperation between companies. They state that horizontal cooperation can be a means to share risks, save costs, increase investment, pull *know-how*, enhance product quality and variety, and speed up innovation. In principle, the horizontal guidelines recognize that in many cases cooperation between companies is beneficial, however, they also warn against restriction of competition when collaboration becomes a tool to collude or exchange sensitive information. The standard to look at, with respect to fixed and mobile networks or infrastructure cooperation, is included in the section on production sharing of the guidelines.

The concerns regard the coordination of competitive behavior: if competitors work together, or if there is an anti-competitive foreclosure in downstream markets⁸, or if there is an output limitation⁹. Situations where dominant players have no incentives to invest for the benefit of consumers and companies have to be avoided.

In this context, whether such concerns will materialize on the basis of horizontal guidelines depends on the characteristics of the market and the nature and market coverage of the operation. It is important to look at the “counter-factual”; what would have happened or what will happen if these companies are not engaging in the cooperation that they have announced. Also, it is important to look at different aspects such as whether the parties have high market shares; they are close competitors; customers have real possibilities of switching suppliers; one of the parties is an important competitive force regarding the others; the parties exchange commercially sensitive information, and whether costs savings claimed by the parties are actually passed on to consumers.

Two cases have been looked at very closely and are relevant nowadays in the mobile infrastructure world. The first one is the case of Czech network sharing¹⁰ from which a statement of objections from the European Commission was issued in August 2019. The second case is Italian network sharing,¹¹ where the focus was primarily on the merger aspect.

As a broad principle, mobile network sharing falls in the category of horizontal agreements, which in many cases benefit consumers and companies and allow companies to save costs and roll out the network faster. However, as mentioned before, network sharing also entails detailed coordination and information exchange between competitors, which in certain circumstances may have negative effects on competition.

Regarding the Czech case, the European Commission’s main concern was that the network sharing agreement was between the two major operators in Czechia and the network sharing constituted one of the largest in Europe, covering all existing technologies, having a nation-wide scope, and affecting 85% of the population. It was assumed that although the agreement was likely to cover areas where the parties were capable of rolling out their network in a competitive and profitable way, the cooperation was likely to have negative effects. These negative effects relied on the fact that the agreement concerned the two biggest players and had a very extensive scope, thus putting the parties in a position where they would have reduced incentives to continue investing in powerful networks, hence, affecting consumers. This analysis is in line with the principles developed by the

⁸ Foreclosure refers to a strategic behavior by a firm or group of firms to restrict market access possibilities of potential competitors either upstream or downstream. Downstream markets refer to the next stage of the production/distribution chain, for example, the distribution and sale of motor vehicles would be a downstream market in relation to the production of motor vehicles.

⁹ The fear that cooperation between important competitors limits innovation and investments.

¹⁰ In this case, the European Commission informed Czech operators of mobile telephony O2 CZ and T-Mobile CZ, as well as the Czech telecom infrastructure provider CETIN, of its preliminary view that their network sharing agreement restricted competition in breach of EU antitrust rules.

¹¹ The European Commission approved the proposed acquisition of joint control over INWIT (a joint venture to together Telecom Italia's and Vodafone Italia's telecommunication towers located in Italy and rent space on these towers mainly to telecommunication operators) by Telecom Italia and Vodafone. The approval is conditional on full compliance with a commitments package offered by Telecom Italia and Vodafone.

European regulators in their common position published in June 2019¹², which is based on general considerations. According to Ms. Wezenbeek, although the competition authority has to engage in a case-by-case fact-space analysis, it considers the principles developed by regulators very helpful as a framework of assessment.

BEREC signals that, depending on the market context and the contractor set-up, the cooperation on network sharing can have a negative impact in incentives to invest and lead to delays in deployment. Another potential disadvantage of cooperation signaled by BEREC would be having to deal with an additional layer of bureaucracy, as operators depend on their contractual partners to operate. BEREC also categorizes the areas where network sharing would imply fewer objections, and vice versa, based on population density. In denser areas, companies can compete, and competition is preferred, instead of network sharing. In least populated areas, network sharing could bring cost savings and advantages because in those areas, companies may have difficulties rolling out by themselves and the population may suffer because it is not a priority for the operators to roll out their networks. For moderately populated areas, there is the need for a case-by-case analysis.

The second case is the Italian case, where Vodafone and Telecom Italia Mobile (TIM) announced their engagement in extending passive sharing¹³ to cover the whole country, actively sharing their network, sharing their backhaul and bundling their towers in a tower company used to reduce costs. The question was if the operation was a joint venture in which the partners bundled their towers and if it need to be notified under the merger rules.

The answer considered the full functionality of this joint venture and on whether it could function in an autonomous way independent of its parents. It was concluded that the joint venture had to be notified to the merger unit. At the same time, the anti-trust unit Provisionally looked into the cooperation in terms of passive and active network sharing and backhaul sharing.

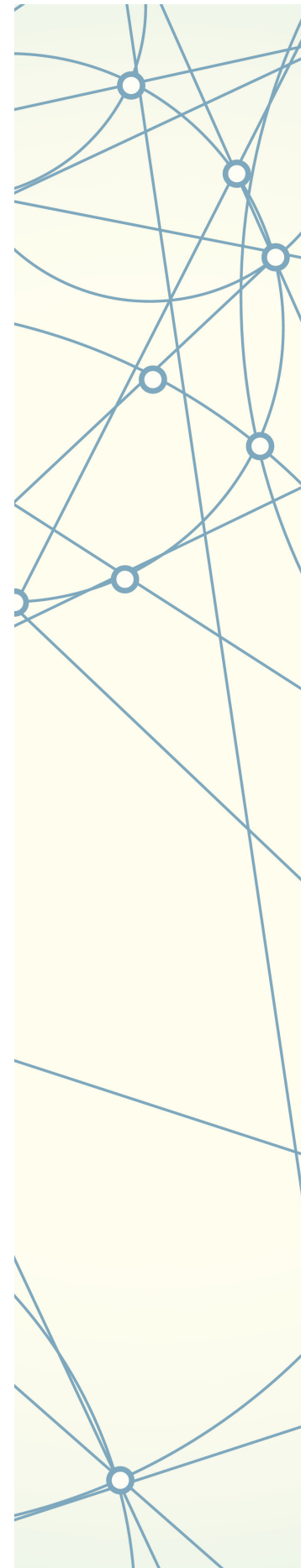
The merger unit found that the proposed transaction, as originally notified, could have negative effects. First, it could reduce competition in the market for renting space on towers to telecommunication operators in Italian municipalities with more than 35,000 inhabitants. Also, considering Italian urban urbanization requirements and electromagnetic requirements, there were many cities that had little space available for new towers and the space that was already there was already given to the parties who created this joint venture (Vodafone and TIM). Thus, it could shut out telecommunication operators from the market by restricting their access to those sites.

Nevertheless, DG Competition considered giving a “clearance” in the first phase of the merger assessment, where the parties had the opportunity to offer remedies. The package of remedies was negotiated on FRAND terms¹⁴. It aimed to put competitors in the same position as they would have been if the merger did not take place by giving them access to sites largely managed by the two joint venture parties. The package also included a procedure to timely respond to third parties' requests for access to the towers

¹² https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches_positions/8605-berec-common-position-on-infrastructure-sharing.

¹³ Passive infrastructure sharing refers to infrastructure at cell site which is not capable of transferring or generating electronic data, like antennas and mast sharing. On the contrary, active sharing refers to infrastructure that is capable of transferring or generating such data.

¹⁴ The complexity of standards in Information and Communication Technology (ICT) creates a tension between the need to reward the owners of Standard Essential Patents (SEPs) that may cover standard specifications and the need to make standards available to all for public use. In the last few years, this tension has crystallized into a difficult debate on licensing principles that must be Fair, Reasonable and Non-Discriminatory (FRAND or FRAND licensing).



(among other remedies¹⁵). The Commission concluded that the transaction, as modified by the commitments, would no longer raise competition concerns. However, the decision is conditional upon full compliance with the commitments.

Also, network sharing was analyzed in a provisional way. Telecom Italia and Vodafone intended to extend their existing agreement to share the “passive” parts (masts, towers, etc.) of their networks to the whole of Italy, and to share the “active” parts (the signal processing equipment) of their 2G, 4G and 5G networks outside all municipalities above 100,000 inhabitants, as well as most of their densely populated suburbs. As recognized by the Commission, network sharing is a widespread practice in Europe that can facilitate the roll out of electronic communications networks by reducing costs and such types of cooperation are generally supported. At the same time, network sharing also entails detailed coordination and information exchange between competitors, which in certain circumstances may have a negative impact on competition. In order for its efficiencies to actually benefit telecom clients, an appropriate balance must be found between cooperation and competition in order to ensure compliance with EU antitrust rules. Where this balance lies must be assessed on a case-by-case basis and depends on several factors, related – among other things – to the extent of sharing, the content of contractual arrangements and specific market circumstances¹⁶.

The Commission decided not to open a formal process under anti-trust rules taking into account that both parties were willing to scale down their intentions with respect to active sharing, freeing up 30% of the Italian population and more than 33% of the traffic. The criteria applied was an absolute population criterion (where cities with more than 100,000 inhabitants will not have active sharing) and a population density criterion. The latter was important to the Commission, as competition in dense areas is important and network sharing may generate less cost savings and “hold back” competitors.

With regards to standardization, the 5G standardization is very important for IoT and can be pro-competitive as a whole since it is unrestrictive in terms of debt participation (if the terms are transparent, if there is no obligation to supply and there is a standard on FRAND terms). However, it can sometimes be restrictive if it leads to restrictions in price, foreclosure of innovative technologies or discrimination of certain players. The rules of standardization need to ensure that all competitors in the market can participate in the selection process and have objective and non-discriminatory procedures for voting rights. DG Competition is going towards a review of horizontal guidelines due to a perceived need in the market for more cooperation, in particular in research and development. The revision will also tackle issues flagged by stakeholders such as cooperation on information exchange, data pools, standardization, joint purchasing and sustainability.

Finally, with respect to vertical cooperation, the importance of keeping upstream and downstream markets open was highlighted, with a clear example being the Broadcom Decision¹⁷. The issue was that the firm had exclusivity agreements with a set of its clients (six companies) and those agreements were *prima facie* held to foreclose access to the market by competitors of Broadcom. In this matter, an investigation was opened and the conclusions were evident on the harmfulness of these contracts and the damage done to competitors, who risked being pushed out of the market. In this case, an Interim Measures decision was adopted to help to keep these markets open.

¹⁵ The package of remedies included the following measures: making available on FRAND terms space in 4,000 towers in Italian municipalities with more than 35,000 inhabitants, publicly announcing such space, setting time limits in the procedure to decide whether there would be space, setting only technical reasons to refuse space to competitors and including there a fast-track dispute resolution mechanism with an independent expert. Moreover, the two parties could not early get out of their existing contracts with competitors.

¹⁶ More information about the analyzed case in https://europa.eu/newsroom/content/mergers-commission-clears-acquisition-joint-control-over-inwit-telecom-italia-and-vodafone_en.

¹⁷ Here, the European Commission ordered Broadcom to stop applying certain provisions contained in agreements with six of its main customers. This will prevent serious and irreparable harm to competition likely to be caused by Broadcom's conduct.

3. Round table: Towards a Single European Market in Telecoms

Moderator:

LORENZO PUPILLO

Associate Senior Research Fellow CEPS

A couple of weeks ago, Margrethe Vestager presented in this same room the digital package of the European Commission and mentioned that one of the reasons why the European Union does not have a strong digital single market is because we are not sufficiently true about aiming for a single market. It is something that we established, then looked away, then we looked back, and all kind of barriers have grown since then. She used a very nice metaphor. She said: “the single market is like a lawn that we have to mow every week, otherwise weeds will stick up, suddenly there are more tree sprouts. And if you forget about it, you don’t have a lawn anymore, but a mess.” If we look into the last Commission, the June European Commission, has been very active in industrial policy, innovation policy and digital policy. However, progress towards the achievement of a digital single market hasn’t been made and many proposals are still pending. So today, this is a great opportunity to talk about how European Union can move towards a more integrated digital single market.

Speaker:

MR. DAN SJÖBLOM

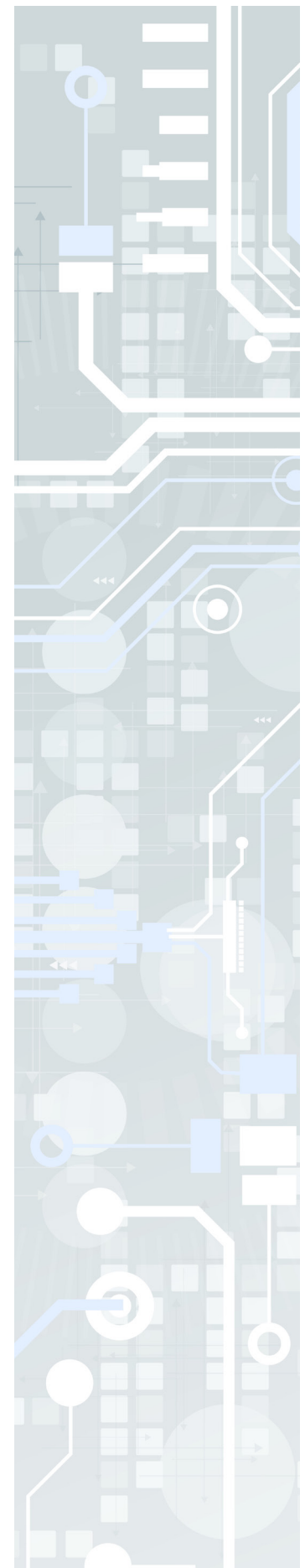
Director General of the Swedish Post and Telecom Authority (PTS)

Body of European Regulators for Electronic Communications (BEREC)

We are today discussing the competition regulation in the telecommunications market, the impact of 5G in EU competitiveness. That’s quite a mouthful and quite a lot, and you can take many different angles on this, so I am going to share with you the BEREC angle and what BEREC is doing. BEREC has been – since its inception, since European telecommunication policy – very much focused on internal market issues. So, that is very much the *raison d’être* for our organization. But, why is that so? You can imagine that this is not like competition regulation, where there is actually a decision or order for sharing competencies between Rita’s organization (DG Com) and national competition authorities where cases can be pulled back and forward between the EU and its executive arm. In telecom regulation, there is European regulation but EU does not have an executive arm in telecoms, so everything must be done at a member state level, which makes a huge difference.

The need to ensure some sort of consistency is greater among the National Regulatory Authorities (NRAs) that are members of BEREC, because we are the ones implementing the European legislation. And you can imagine how it would look if we didn’t try to do that in a coherent and coordinated fashion. It would be very hard indeed to run telecommunication businesses across the Union, if you have potentially, 28, 35, or whatever the number is, different legal regimes that are applied. So that’s very much what we do in BEREC and our focus has also always been to benefit the consumer but also to provide good environments for businesses to grow and thrive.

There is another big difference between competition and telecom regulation in the sense of ex-ante and ex-post. So, you heard Rita’s explanations about the ex-post investigations



into Czech Republic, which is not something that we tend to do. In telecoms, we tend to, instead, set the ground rules for how operators should behave and we, of course, follow up on behavior. But one thing that I found very different in this field – compared to when I was in competition – is that we have, because we are sort of the market shapers in the sense that we regulate market shape and market behavior, much more I think of an ongoing dialogue with operators and stakeholders. We need to have that. And that concerns so many aspects of something as complex as telecom regulation and specially preparing for 5G.

We talk about: where are the future bottle necks? What does the market look like? Where is the need for regulating privacy, security, interoperability issues, coverage issues, consumer protection issues and quality of service issues? There are so many aspects to this, and of course, we cannot pretend to understand this as well as the people in the industry who are actually doing these things. So that is why we have a very big need for an ongoing discussion and we are in close contact with the operators big and small – that's very important.

So, a very strategic objective of BEREC is to promote effective competition, which also means promoting efficient investment conditions, which means promoting predictability. We also promote innovation so, as I said, big and small, new and old, all kinds of operators are interesting to us. And finding ways for new ideas to be able to come to the market is also central to our approach.

And we don't do telecoms regulation alone in Europe, which is also important to underline. Most of you probably know this, but it's a relatively complex web of organizations that actually do this. So we are in charge of market shaping and consumer protection. And then there is an organization called ENISA,¹⁸ which is essentially in charge of security issues. Then there is an organization called the RSPG,¹⁹ which is essentially in charge of spectrum issues. These three organizations are, in one fashion or the other, linked to the EU Commission, but in very different ways organizationally and structurally. I don't have the time to go into all that, but it is quite a fascinating world and I can understand if it is a little bit confusing.

As we will soon hear from the GSMA, it is a little bit the same if you look at the organization between the operators. There is a bunch of different organizations in Europe with neighboring responsibilities. I once spoke to some people in the United States and I think that, you know, we often hear that Europe is not very coordinated. It is actually a little bit challenging to describe how all this activity, both, at government and EU level, and at the operators' level is coordinated in Europe. But it actually works, that's the good news. Even if it is a bit hard to explain.

So, I wanted to say, on 5G more specifically, that spectrum access to spectrum as mentioned recently, is vitally important to roll out 5G. There are the pioneers' bands²⁰ that have been identified and that is something BEREC is working on together with our friends in ENISA. We have very good collaboration there. But, equally important – and not often a little bit forgotten in the discussion – is the continuation of the fiber roll out, which is another task that BEREC is very much involved in, ensuring that we get fiber everywhere. Because if you don't have fiber up to the antennas, you don't have your backhaul, and then it doesn't really matter how much spectrum you have, you won't get

¹⁸ The European Union Agency for Cybersecurity (ENISA) is the Union's agency dedicated to achieving a high common level of cybersecurity across Europe.

¹⁹ The Radio Spectrum Policy Group (RSPG) is a high-level advisory group that assists the European Commission in the development of radio spectrum policy.

²⁰ The commission's implementing decisions for the harmonization of spectrum for wireless broadband electronic communications services are based on the principle of technology and service neutrality. Therefore, no exclusive use for 5G is mandated for the 3.6 GHz band either. 5G will rely on its progressive deployment on the other two pioneer bands in the Union (700 MHz and 26 GHz) until 2020, as well as on further spectrum – both in existing EU-harmonized bands below 6 GHz and new spectrum in the so-called mm-wave bands.

it out and do a good service. And then on security, of course, we collaborate a lot with our friends in ENISA, and everyone has surely seen the discussions around the tool box and the enhanced attention to security issues in particular related to 5G, but I think relates to all of the telecommunication system and ecosystems. Security is just being taken up to another level of attention and for good reasons, I think.

So those are all things that we are trying to bring into a single movement into the right direction where we get the services to be released and, through Europeans to experience the benefits for 5G, to release the potential it has for innovation, and for new services for both: users and companies.

Speaker:

MR. ROSARIO BARATTA

Europe Head of Competition. GSMA

The GSMA's impression of 5G is potentially very much disruptive as far as competition law application is concerned. GSMA draws its attention on both, the traditional and innovative aspects of competition. Because as Rita was saying, 4G is going to be with us quite a while, and even if 5G in Europe is going sufficiently fast, the competitive landscape will be 4G-centric still for a while.

This is why GSMA has recently presented a study on market structure,²¹ which basically concludes that in terms of investment, latency, speed, and coverage, normally three operators' market outperform four operators' market.

I'm talking about tradition, because it is extremely linked to the traditional way of seeing competition in these markets, which is the result of many precedents we have had in recent years (we will not consider the previous precedents from 2004-2012 because they are, let's say, less relevant – the Greek and first Dutch mainly). But still, we are looking at this market as if the situation will be like it is today.

On the other hand, we are also looking at the dynamicity, the innovative and disruptive force of 5G in this context. It is a fact that we mobile operators are a bit "at the lion's face," but it is true that connectivity is progressively becoming commoditized and that operators need to find new revenue sources. Which is what we are doing at present and this is going to be more and more the case in the next few years.

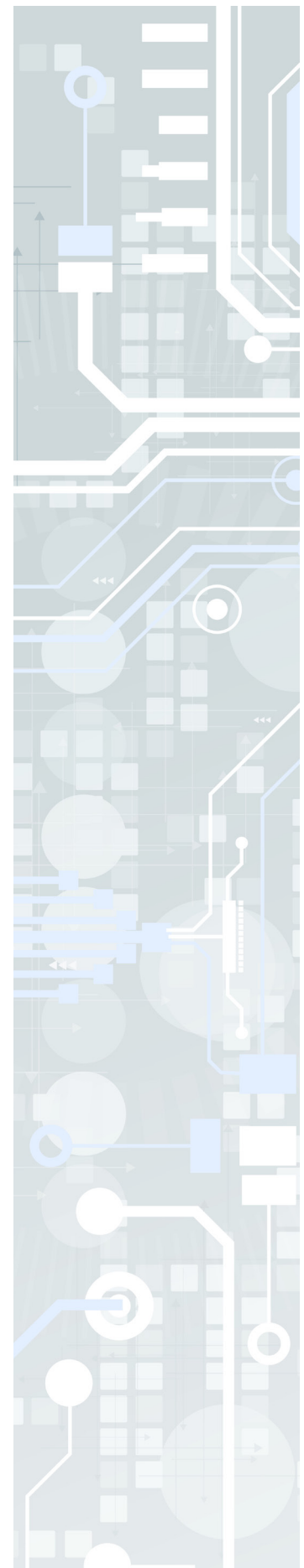
Last but not least, this also has a consequence in the way networks are built. Our main project in GSMA is called "Future Networks," which means that we really are aware of the fact that 5G networks (or whatever we call them, 5G, 6G, 7G) are going to be philosophically different from what we have seen today up to 4G. For many reasons, I will go through a couple of them.

Tradition

This is a snapshot of our study²²; we have explored 17 markets with three operators and four operators, with some exceptions. And, as you can see, our results say three operators normally outperform – not terrifically but in a substantive way – four operators market. I also had a slide on prices. Our study shows that normally price dynamics are more or less similar in 3G and 4G, especially if you look at the price for gigabytes or megabytes rather than the entry price, but we don't have enough data supporting this, so I prefer not going through it.

²¹ GSMA. (2020). Mobile market structure and performance in Europe. Available at: <https://www.gsma.com/publicpolicy/resources/mobile-market-structure-and-performance-in-europe>.

²² The study covers different aspects of the market structure. It looks at the traditional (4G era) way of looking at competition in these markets as a result of different presidential terms in the EU. It also looks at the dynamic and innovative disruptive force of 5G and how it is influenced by new factors such as network flexibility and new models of network ownership. Moreover, it looks at how the progressive commoditization of connectivity will push operators towards exploring new sources of revenues. Finally, it addresses how future networks are going to shape the future in a different manner to what we have seen with 4G.



We also have a slide on network sharing. It basically shows what we have said and that is that network sharing gives a better performance to markets than normal pure four operator markets. But still less good than with three operator markets.

Our takeaways of this very traditional point of view is that on average, three operators outperform four operators markets, which is something that was, more or less, present in a study chaired but Tommaso Valletti and some other academics.²³ This shows basically that on average, there are more investments in three operator markets, something like 15% more investments in three operator markets. While of course, they recognized there was upward pricing pressure, which was more or less of the same magnitude.

Our point of view is that the impact on prices is probably less relevant. There is an interesting article that says that the upward pricing pressure in most of the recent four to three mergers is more or less similar to the one which was identified in the recent Dutch merger, which was cleared in phase one. So again, of course, merger is case-specific, but there can be different points of view when looking at them.

Innovation

What is innovation? I identified two mainly innovative elements: the need for operators to diversify their revenue sources and the fact that 5G networks have a different configuration. These networks are more flexible, are more software-driven and you will see that they tend to be more diverse in the way they are constructed. So they will not be 100% managed by operators and potentially they can be not built 100% by vendors or the same vendor. You can have different vendors, different providers, contributing to the same network.

Regarding connectivity, revenues are progressively going down and professional services, applications and platforms are steadily going up. This means that telecommunications need a new revenue paradigm. As connectivity increases, revenues decrease. The new value generation lies in the professional services (system integration, consulting and managed services), fueled by the continued digitization of industries; and applications, platforms and services (cloud data analytics and security), which is the key growth area of IoT.

This slide is a snapshot of what main operators are doing around the world. We can see that Americans are very much ahead, Europeans lagging behind but we are catching up progressively.

Regarding the way networks are going to be built, our 5G networks have been progressively more based on cloud technology. This was already the case in 4G, but in 5G this is going to be more the case. And the change is that the cloud that is going to be used is going to be open sourced and it will allow having a mix of providers that is wider than it used to be in the 4G world.

This of course has regulatory implications. First, there are competitive implications as vendors are progressively converging in providing telecoms services and vice versa. And this is even more true if we go from the core to the edge, because the edge of the network at present is a place where operators are concentrating their forces because this is where they see the possibility to provide more added value to the final users other than verticals. This contamination between the two worlds of vendors and telecoms will have an effect on market definition from the product and the geographic viewpoint. The more you virtualize the network, the more possible it is for different categories of operators to converge and potentially compete.

²³ Reference to the following study: "Evaluating Market Consolidation in Mobile Communications," written by Christos Genakos, Tommaso Valletti and Frank Verboven, *Economic Policy*, Volume 33, Issue 93, January 2018, pages 45-100, <https://doi.org/10.1093/epolic/eix020>.

The final takeaway in regard to 5G networks' new characteristics is that it will imply new and big revenue opportunities for the whole ecosystem, part of which telcos are very much willing to profit from. But they will have to adapt to the change in the way networks will work.

Also, 5G networks are distinct from previous generations because they are heterogeneous. They are a combination of mobile, fixed and other types of software based inputs. And this has an impact on the ownership, which is going to be more diverse than it used to be. It also has an impact on the competition for the production and construction of these networks and, eventually, for running these networks.

So, we have an alternative network that can potentially impact the competitive landscape. As I said, we see a progressive conversion between vendors and telcos and, at the same time, the telco world is needing to find different revenue sources. In this way, we have assisted for many years (and this has been our main narrative) the famous level-playing field.²⁴ If I had a euro for every time I had heard the word "level-playing field," I will be a billionaire. This has been what we have always said: we had the OTT²⁵'s coming to our markets, providing our services and we were a bit concerned about the fact they were not regulated in the same way.

Now, the landscape is changing. After years of being "invaded" in our market, we are trying to have a reaction and diversify our revenues into other contexts. And that's why we go back to my question to Rita: cooperation is probably becoming one of the main issues. At least in our industry because, in many cases, if this industry wants to be an effective competitor to Hyperscales²⁶ or OTT's, or you name it, you inevitably need to join forces. Now, I take the point that there is no negative approach with that and I agree with that. The point is that we are much more competitively competing than we look like from the outside. So, it's an industry that is extremely competitive internally and it makes it extremely difficult to find an agreement on these cooperations. And, if you, on top of those difficulties, add an antitrust assessment, it will in many times be a more complicated assessment. And many operators, many members in our case, may have many points of view on that and you can be sure that it is going to kill most of these projects. That is why, and I recognize that the Commission has been extremely welcoming in talking to the industry and giving guidance and advice, but I think that needs to be strengthened and potentially formalized.

In the end, this is what will convince more people that one direction is the right one. We need more formal guidance on most of these cooperations.

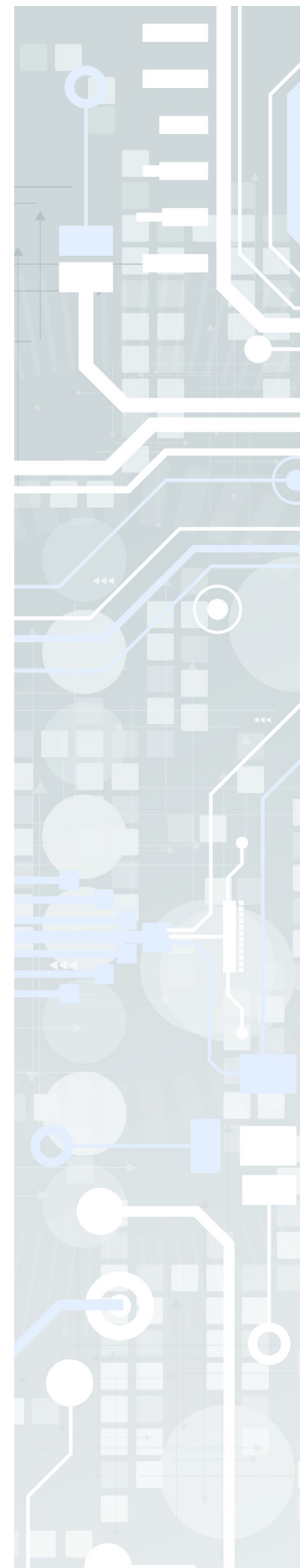
My last slide is about our takeaways on innovation, but I have already said that the elements that I have been describing are going to potentially change the competitive landscape.

My last word in this presentation will be regarding the elephant in the room that is the single market. Of course, we do not have a mobile single market so far. We do not have a digital single market so far. There are many reasons: one is set on the spectrum that is being assigned in an upward and diversified way. I think there is an effort to be made from the industries, certainly, but also from the regulators to push that forward.

²⁴ This expression is typically used in discussions about the role of telcos vs. Over-the-Top service providers (OTT's), i.e. agents that offer telecommunication services over Internet connectivity such as Skype or WhatsApp. The expression refers to the telco operators' complaints about OTTs not having to comply with the EU's strict and extensive regulation on issues such as user rights, antitrust, security, net neutrality or Significant Market Power (SMP), which create difficulties in competing with these services. While the General Data Protection Regulation established stronger cross-sector regulation in the area of personal data, policy options that would help to create a level playing field for telecoms and OTT providers include extending some telecoms regulatory requirements to OTT services and reducing sector-specific constraints on traditional network operators.

²⁵ OTT stands for "over-the-top" and refers to the productized practice of streaming content to customers directly over the web. It represents the future of entertainment – one that is already unfolding.

²⁶ A Hyperscale (or Enterprise Hyperscale) data center is a facility owned and operated by the company it supports. This includes companies such as AWS, Microsoft, Google and Apple. They offer robust, scalable applications and storage portfolio of services to individuals or businesses. Hyperscale computing is necessary for cloud and big data storage. They have anywhere from 500 Cabinets upwards, and at least 10,000 sq ft. in size and usually have a minimum of 5,000 servers linked with an ultra-high speed, high fiber count network. A noticeable difference from Enterprise to Hyperscale is the High Fiber Count utilized across the network.



Speaker:

MR. JEAN-PIERRE FAISAN

Chairman of Communication, European Wireless Infrastructure Association (EWIA)

“Towards a Vibrant 5G market”

The foundation for a vibrant 5G market starts with infrastructure and passive infrastructure. Now, we have already discussed a lot about networks sharing and passive infrastructure sharing and I think I would like to address this with a slightly innovating viewpoint and maybe a question to the audience. Did you know that in the US and Canada, 67% of the passive infrastructure is actually outsourced to independent players (players that have no link with Mobile Network Operators, MNOs)? It's a growing trend, a global trend, and in Europe there is a moderate but growing 21%. So, what I would like to address today is the benefits of this growing trend towards 5G markets. Especially, how it can help to handle what we see as three of the key challenges for Europe's digital age. Europe needs more towers. To achieve higher frequencies, we want to have connectivity everywhere, and of course we also need more small cells. Europe needs fast access to the market – fast roll out because there are major advantages if things happen in two to three years rather than if they happen in eight years). The third point is that Europe needs to build enough capital to build all that infrastructure.

I have the honor to represent the European Wireless Infrastructure Association (EWIA). It's a relatively new association with 10 independent members operating in 10 countries. You will note that in most countries there are several of our members operating, so there is competition and even with that provision, we are independent. This means that we are not owned by MNOs or by joint ventures of MNOs, which is really what sets us apart. And now, what do we bring, in our views, to the single market? We bring three things: infrastructure of existing (and future) sites; we provide quick and open access to it; and we are able to provide long-term financing.

The first one, 5G enabler NO. 1, relates to the infrastructure. The current members account for 75,000 existing sites, and they are building or requiring new ones, which is quite significant. Their contribution to the market is that independent towers can account for more customers – almost 50% more – relative to those owned by MNOs or even joint ventures of MNOs. This comparison chart shows how many wireless points of service there are in a tower owned by MNOs (either directly or through joint ventures) and independent TowerCos (so, independent providers) where basically the ratio is 1:2. This collocation ratio, this difference, makes major advantages in terms of economics (because there are fixed costs that of course are a bit higher when you have larger infrastructure). This is because, in the end, you share these costs and this yields to a very much reduced total cost of ownership. Altogether, it's been calculated, according to the figures provided by EY last year,²⁷ that the economic benefit of sharing – if we were to reach an outsourcing share of 50% and, as I said, we are at 21% right now – will be translated into €31 billion worth of economic savings over the next decade. So, that is not neglectable.

The second benefit our industry brings is that we facilitate quick and open access. Somehow, nobody really knows how 5G will evolve. Clearly MNOs will play a major role, but also vertical sectors, also IoT and emerging actors. Well, we are happy to have them all on board, and the more the merrier we would say because we want to share our sites with as many customers as would come and we are very happy have them. Also, we reduce the time to market because we are able to bring them existing infrastructure and we also lower the threshold for entry, which is good for innovation. Moreover, in the prospective of 5G, we go beyond just providing sites towers, but also fiber connected to

²⁷ Ernst and Young. “The economic contribution of the European tower sector. A report for the European Wireless Infrastructure Association”, April 2019, <https://www.cellnextrends.com/wp-content/uploads/2019/07/20190515-EY-EWIA-Economic-contribution-of-the-European-tower-sector.pdf>.

small cells, distributed antenna systems (DAS). We build infrastructure along transport exits, for instance, which is a major policy coverage goal. And, in some cases, we can provide edge computing. This is something happening in the various projects that our members are carrying out.

The third 5G enabler, relates to capital and long-term investment. The members have a significant investment capacity and they can tap into infrastructure funds, which are long-term funds with about €160 billion available to be invested. It is interesting to note that this investment is not the same as the traditional telcos financing. It does not have as a funding source the MNOs but a different funding source, with a different cost of capital. The estimations show that, if the market share of independent telecom tower (TowerCos) ownership of Europe grows from 21% to 50%, the capital release would be €28 billion. Of course, this is not going to put all the financing needed for 5G, but this is not a neglectable part. And you would think that with such numbers the market would not notice it, but actually, the market does notice it. This is the market share in terms of number of towers outsourced to independent TowerCos. In 2014, it was 13%; in 2018 it was 17%; and last year we reached 21%, which is a 4%-point increase. So, steadily the market share increases and it increases in two ways: either through site buybacks or through the creation of new sites by independent TowerCos.

To sum up, we see three challenges for Europe in 5G matters: more towers, fast roll out and capital. To contribute to their attainment, EWIA provides the existing infrastructure and the ones under development, quick and open access, and access to new sources of long-term investments. Hence, greater outsourcing represents a pro-competitive opportunity to boost a single European market in telecoms. We are calling for policies that integrate from the outside the fact that there is this possibility in the supply chain. It is not exclusive, as we have seen it is still a relatively small part of how the supply chain is organized right now, but it is something which can play a beneficial role. It is pro-competitive and avoids many of the disagreements that have been highlighted in the infrastructure sharing deals which make them very complicated to actually be done everywhere. So I think it is very complimentary and it can provide major benefits for the European single market.

Speaker:

MR. FRANCESCO DE LEO

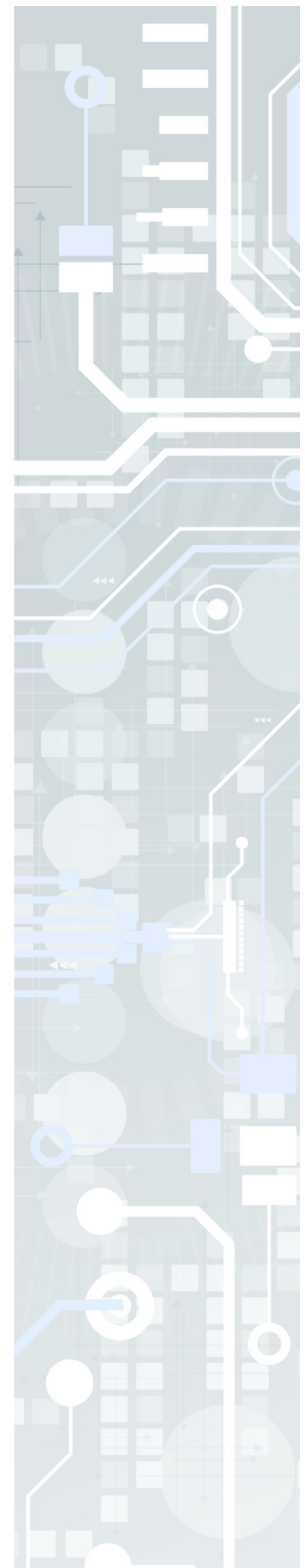
Executive Chairman. Kaufmann & Partners

Taking a different perspective and bringing a different point of view, we are deeply concerned about a possible market correction across financial markets of a minimum of 30-40%. The crisis that we are currently going through is clearly worse than the one of 2008. And, when we look at this kind of trend we need to understand where is the telecom industry is and which are the challenges we need to face.

The first challenge goes back to 2012, when the European telecom industry – basically the main firms – helped to develop market caps from €134 billion to €244 billion. The expectation is that this is cut down by 30% as market capital in the following weeks. So we are talking about an industry that is shrinking in terms of market capital.

At the same time, there is an increasing level of debt. In Europe alone, European telecom companies have around €400 billion worth of debt and about 203 of them have a speculative grade about E minus or lower.

In this respect, when we talk about where 5G is going to fall, we need to understand where we are and what kind of market conditions we face. The concern comes with the roll out of 5G networks across Europe as the investments in this would take longer than expected.



Given this view, we need to identify the opportunities to get the roll out of 5G back on track. I am confident that independent TowerCos can play a pivotal role in enabling the delivery of telecom industry, as Jean Pierre has just highlighted to us. It is going to be one of the few ways for Telcos to unlock fresh capital resources that can provide network upgrades and new services. But we are also concerned about the fact that the trend towards TowerCos managed by carriers at the national level will be very questionable in terms of unleashing fresh capital resources. Because most of the time the call is subsequent to or for an initial public offering (IPO) and, in our opinion, with these kind markets it is going to be unlikely to see IPOs of this size taking place any time soon.

What can we do to move forward? To stay competitive, European companies will have to have access to 5G networks in a faster manner. Currently, we do not see any chance to get the kind of financing that is needed to set back in motion the kind of investment that we saw in the past. This means that the next four to six weeks will be very important for understanding how the financial markets will react and the impact of the coronavirus on the market. In this scenario, the investors will be very reluctant to place more money in the European telecom business, which is already burdened by debt because as we all know, most of the debt for the 4G deployment has not yet been paid off. We understand that the typical suppliers of networks, like Huawei and ZTE, will not be likely to have the same kind of role they had in the past. So that makes it even more difficult for European telecom carriers to have a chance to speed up the roll out.

At this stage, the only possible chance is to see how independent TowerCos can become part of the picture and they probably can do so over a basis of two different drivers. With the first one, as it was mentioned in the previous presentation, there is an amount of capital that is ready to be invested in infrastructure, and the great merit of independent TowerCos has been the infrastructure raise or retail and technology raise. This is not the case of joint ventures built up by TowerCos and managed by European carriers. The second point is the neutrality brought by independent TowerCos, which is probably one of the key triggers, to be sure, so that we can build up a vibrant set of provider market spaces all across Europe and that is the only chance we have to stay in the game. As China and the US are moving towards 5G at a much faster pace – and if we are not able to close this gap – it is very likely that the European industries will suffer in terms of competitiveness.

So, neutrality is not just important for a network set that will be used within metropolitan areas. It is going to be even more important for indoor coverage, where what we see is that joint ventures managed by telecom carriers providing indoor coverage can trigger some optimal level of investment, while it will be very difficult for other players to collocate their equipment. Additionally, given the coronavirus, people will be tending to spend more time within facilities instead of being in the streets, meaning there will be a change in consumer behavior that we must take in account.

So, in our view, neutrality brought up by independent TowerCos is possibly one of the key triggers that is going to unleash the opportunity for Europe to see a timely roll out of 5G networks. Also, it is much easier for the investor to look at the balance sheet of an independent TowerCo. It is much easier for infrastructure funds to place their money and build up the balance sheet that is needed to tap into the kind of investment they see in place.

When you look at companies like Telecom Italia, their shares were trading about 90 cents per share three days ago. Now (March 10, 2020), they are trading at 40 cents per share. Right now, the prices in the market of telecom firms are decreasing and will not be back any time soon. The investors will have to wait for companies that are over boarded with debt. Taking this into account, it is going to be very unlikely that companies like Telecom Italia will have the kind of access to investment they need to upgrade their network infrastructure. Currently, when this conference is taking place, the country is in lockdown. Consequently, the network is not going to support the level of traffic.

Moreover, everybody is anticipating that telecom carriers will make more profit, because everybody is staying at home, when the reality is the opposite. Unfortunately, most of the prices go to the fund-fee, so the only players that will make a profit are the OTT's or the contact providers. So, we will see a growing pressure on revenue schemes, margins and cash flow generation that will become a very key focus for investors. In addition, we will see a race in support and maintenance costs that European carriers will have to face if the coronavirus spreads.

One final important point is that investors, as was very evident in Davos back in January,²⁸ are becoming very focused on understanding the energy efficiency of 5G networks and the carbon footprint. So, this means the overall sustainability and the guidance that we can provide in terms of being capable of getting the kind of matrix and KPIs that are going to make investors confident. Also, that we are going to build the next 5G network with all the kind of requirement needed to have a better carbon footprint. Currently, there are very few companies that are leading this race. One of these is Cellnex, one of the largest European infrastructure telecom providers. Investors are very keen to place a premium on these kinds of companies.

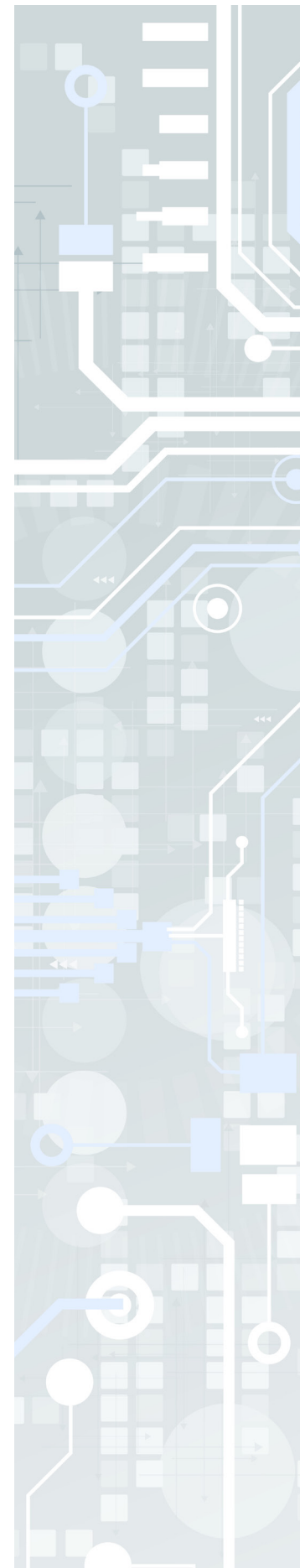
To provide an example, in May 2015, Cellnex went to the stock market with an initial public offering of about €14 per share with an overall market capital of €3.4 billion. Today Cellnex, even with the market correction, is trading at €44 per share and has a market capital of more than €18 billion. Telecom Italia, at that time was worth about €10 billion, the share price was about 1 euro and today it is trading at about 40 cents. Our forecast is that it is going to decrease to below 38 cents, reaching about 30 cents per share. This means that Telecom Italia is worth €10 billion less than Cellnex. If you look at INWIT, the Tower company that was launched by Telecom Italia two months after the launch of Cellnex, INWIT was launched more or less within the same price range or listed at around €3 billion. Today, it is worth €5 billion, whereas Cellnex is worth €80 billion. And the reason is reason is simple: investors understand much better what an independent TowerCo is, and it is becoming much more difficult for investors to understand why the joint venture between existing towers managed by traditional carriers makes sense, and this needs to be kept in perspective.

My personal view is that overall, the framework of joint ventures between TowerCos managed by mobile network operators is going to bring the European market to a level of fragmentation, and it is a matter of time until investors include this in their analysis. So, if we want to see 5G moving forward, have a chance to stay in the game and not lag behind as the European continent, we need to think about policies and regulations that are going to be key to promote the fact that independent TowerCos will have to play a bigger role in the future. If this is not achieved, money is going to dry out, as is happening right now.

To sum up, the key idea to share in this conference is that we are going through a very difficult and uncertain environment. We have an opportunity – with the current crisis taking place – to re-think where we are standing and set new goals and move forward in a timely manner. If this is not going to happen, 5G is going to be a very aggressive opportunity for Europe, and the fragmentation brought in by TowerCos companies

managed by European carriers will be a dragging factor and not a factor that is going to unleash any capital. Unfortunately, investors are becoming aware of this and are very keen to look at the next move.

²⁸ Reference to the World Economic Forum Annual Meeting in Davos-Klosters, where the world's top leaders in collaborative activities shape the global, regional and industry agendas at the beginning of each year. This year, the aim was to give a concrete meaning to "stakeholder capitalism," assist governments and international institutions in tracking progress towards the Paris Agreement and the Sustainable Development Goals, and facilitate discussions on technology and trade governance.



4. Roundtable 5G Deployment: State of the ArtG

Moderator:

PROF. PATRICK LEGROS

Professor of Economics at the Université Libre de Bruxelles (ECARES)

In this second panel, we take the state of the art on 5G deployment in Europe but with more concern for the downstream aspects of 5G deployment. In particular, we look at how the benefits of 5G can be captured by end users who may have default capabilities and default needs. In the platform literature, this is called the chicken and egg problem. Basically, if there is no demand, there is no supply. Clearly, 5G can be a generator of activities and innovation. But the question is how much is valued by end users. So, this is the broad idea of this panel.

Speaker:

MR. PHILIPPE LEFEBVRE

Head of Sector for 5G Deployment Strategy DG CNECT. Future Networks. Future Connectivity Systems

We start with the safe assumption that 5G is of strategic importance. But the strategic nature of 5G is not that we will have a new radio link. It is because of the blending of connectivity and cloud into a connected intelligent continuum. This is what is going to be the basis of the disruptive or transformational aspect of 5G. It is a transformation for the traditional telecom industry that will have to compete at a different level – software and AI levels. This is a new competency for the operator. The transformation will also be for industry in general, because 5G is likely to become an industrial internet.

So, all these concepts that will be part of a platformization of connectivity, and in a world of connectivity and Internet platforms, market size and the ability to scale up quickly, will become essential. Therefore, the importance of having a single market for connectivity will increase again. There will be no opportunity to start with a very well functioning market on a small member state and then scale up. It will be too late. So we need to address the last barriers to the telecom market, the connectivity market as it has been qualified, beyond of what we already achieved with DSM²⁹. This is what drives our thinking and this is what I will be mainly speaking about – our thinking for the future update of the 5G action plan, which is our strategy for 5G. The action plan was announced in the digital strategy so we will have a new updated 5G action plan by the middle of next year and will work with all the stakeholders to make it the best strategy for the next phase.

The two key challenges we see for this update of the strategy is investment. The first challenge is the fact that we have a €150 billion gap in terms of investment, out of the 500 billion needed by 2025 if we want to meet the current 5G objectives. That is a large gap, where the main needs are more fiber, as was mentioned before, to support 5G base stations on top of fixed locations and the densification of the cellular network. The densification will not happen in the next year or two but is likely to become a main investment challenge by 2025. The second challenge is leadership: we cannot afford anymore to be a follower or a mere user of the technology. We know that 5G will be so impactful and progressive that if we do not develop the technology partially in Europe,

²⁹ A Digital Single Market (DSM) is one in which the free movement of persons, services and capital is ensured and where the individuals and businesses can seamlessly access and engage in online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence. The 2014-2019 Commission had identified the completion of the DSM as one of its 10 political priorities.

we will not get the needed jobs, the economic growth and we will not meet the new objectives of technology sovereignty. We have some good players such as Ericsson and Nokia, but the scope of the game is extending, so we have to be very careful.

All this is, of course, tentative; it's just a state of reflection. The new strategy will need to look at the objectives and probably step up the EU objectives for 5G deployment. We know that if we do that, it has a normative effect and it influences the market. So it is important to get the updated objectives beyond 2025 to set the right level of ambitions.

We also need to look at the new possibilities of the new EU budget and the new investment tools at hand. We are thinking of an investment package for 5G that will be roughly €2.5 billion split into different instruments. Probably the main instrument for 5G will be Connecting Euro Facility Digital (CEF)³⁰, where we are asking for €3 billion, with a part of it going to 5G. Other programs like Invest EU and the Digital Euro Program will contribute. In addition, we are thinking about new channels like venture capital to stimulate demand. So, all this public support should be looked at in support of private investment.

There are also some regulatory measures that are worth mentioning. One that has already been mentioned is the facilitation of investment by enabling cost sharing, meaning network sharing. We understand that this is an unstoppable trend: Rita mentioned the case of Italy, Vodafone and TIM. Yesterday, we had the case of rule on sharing in the UK. Now we have coronavirus. So it's unstoppable, I believe, and we need to find the right – and that's the job of DG Competition – competition rules and instruments to make it happen, while preserving consumer interest and competition.

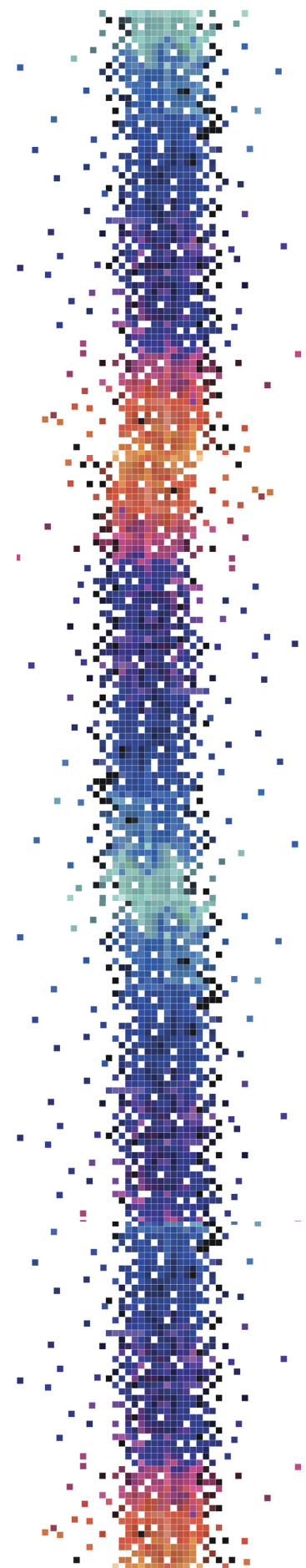
In this context, I think it is not a secret that, from a DG CNECT viewpoint, issues to be raised include the possibility in the vertical block exemptions regulation to look at the new deployment pattern, to look at the new case of market failure. When you look at deploying 5G, for example, in highways for connected mobility, it has a different kind of market failure than when you look at serving households and where you risk having competition mobile fixed and so on.

Also, we might consider IPCIE (Important Projects of Common European Interest) configuration to shelter some investment for competition concerns. Even CEF itself (Connected Euro Facility) being an EU funding will – to some extent – provide a leeway to test new business models and new ecosystems. To lead Europe to success, we will have to discover the new ecosystem, the new business models and so on. And the best way to do it is to let the market do it and see which ones are working and which one requires our support.

Then, in the regulatory field, there is the never ending spectrum issue. We still do not have a single market for spectrum, and we will need to look at the last barriers in this field, which are slowing down 5G deployment. Also, in view of the next spectrum wave – because we are doing a very good job and I never stop thanking BEREC and RSPG and member states for having been so proactive, maybe even more proactive that we have been, in identifying pioneer spectrum for 5G – we need to start to think about the next phase.

Finally, there are a couple of measures you are probably aware of to decrease costs: the small cell act is on the way to lower or suppress authorization requirements for small cells. But we may need to look for permits for larger cells, with the objective of lightening the regime for the two and also for other type of sharing that has been already mentioned.

³⁰ The Connecting Europe Facility (CEF) is a EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at the European level. It supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services.



The last point is about the soft power that we are trying to exercise for the first time by trying to establish a new ecosystem and business models in a dialogue with the industry. We do that in the context of the main application we see during the first phase for 5G or the most impactful sector for 5G, which is connected mobility, connected cars. Typically, there is a risk of market failure, a chicken and egg problem between the telcos, which need revenues to invest in transport and meet the EU objectives, which are very ambitious; and the automobile industry, which will only start to equip cars with proper equipment if they see that the infrastructure is present. The automobile industry already knows that the strategy to automate driving using sensors will come to a roadblock at a point in time, and there is a lot to do with sensors. But, over time, what is needed is connectivity.

So, we have initiated a Strategy Deployment Agenda for connected mobility. We have invited all the stakeholders to the table and this has already shown some results. But it still remains a piece of paper; we still do not know what the commitment is, especially from the automobile industry. In this context, we think that the best way to guarantee commitment is to come with funding. Even if we come up with the lowest share that we can get from CEF (which is €1 billion) and place the money on the table, and then the industry has to come with the other 50%, you force the players to find meaningful economic models.

Thus, this combination of open dialogue with the commission as an honest broker between the stakeholders, mainly telcos and automotive sectors, and the money to force them to commit, is a strategy that could pay off and that is being implemented for the first time. We have been doing this for 5G deployment in railway and it has started to show results. So, in summary, there are new approaches that are being tested, but the financial support to make them happen is needed to take a further step in the strategy.

As an example, in the automotive sector even €1 billion can lead you far because we have calculated that if you want to equip 30,000 km. of a highway with advanced 5G coverage you need €6 billion. If you put €1 billion on the table, a lot of private money can be mobilized. To finish, the commission wants us to revise the 5G action plan or update it by the end of the year and this is a great opportunity to involve the stakeholders and end up with the best possible next step in the strategy.

Speaker:

MR. JOSÉ ANTONIO ARANDA

Product Strategy and Innovation Director. Cellnex

As part of the panel, we discussed that it was worth reviewing the situation and state of art of 5G in Europe, so I would like to make an update on the state of 5G in Europe. Concerning Cellnex, it is the Spanish company that had high towers to convey TV signals to households. In 2012, we started diversifying the business and investing into buying towers from mobile operators. We started with Telefónica, entered little by little into the Italian market buying towers from WIND, then into the French market with WICK. We expanded into the Netherlands with Articom and Shere and, little by little, we have been growing across Europe and now we are present in eight different countries. Our most recent acquisition is Signal in Ireland. We bought their infrastructure and we also bought Omtel in Portugal. As mentioned by Jean Pierre, we are an independent TowerCo and in Europe we represent only 20% as a community. On top of that, we have nearly 60,000 sites in Europe, and one of the things that we have kept on growing is in providing additional services, moving from a passive role towards a more active role.

The traditional business, however, comes from towers. We provide steel, power and internet connection. From there, 5G represents an opportunity to keep the business growing. We have high towers in rural areas providing coverage to different mobile

operators (our towers normally have two or three mobile operators) and we are helping operators deploy in different cities (not only in small cells but also in rooftops).

Cellnex is also part of GSMA, and according to their last report, three countries (the UK, Austria, and Finland) have fully launched 5G. This means that all their mobile operators have deployed 5G in the respective countries. There are a few countries (e.g. Italy or Netherlands) where there are a couple of mobile operators that have launched 5G. Finally, there are countries (like Spain) with one single operator that has deployed 5G. So, this is not a bad situation, but the reality is that it's just a starting phase.

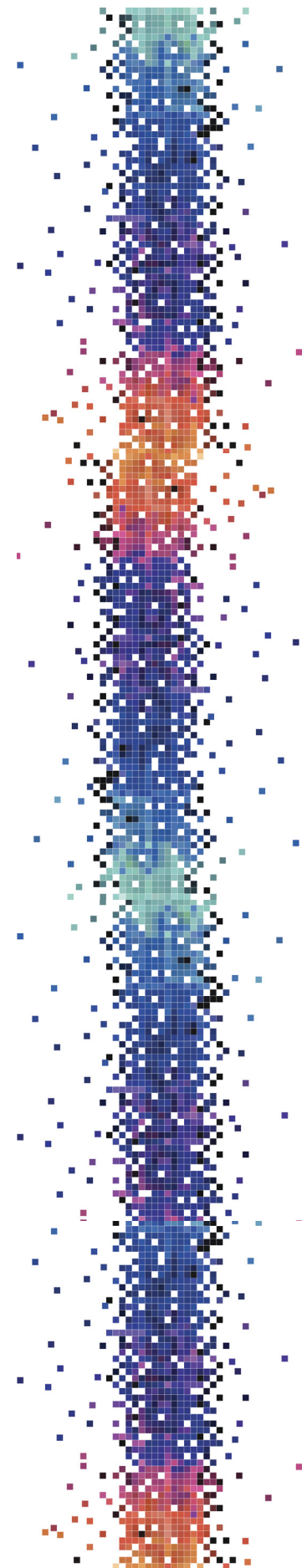
In this starting phase, the operators are implementing the infrastructure according to their licenses to run the spectrum. So, the situation that we see is that currently the mobile operator customers are reusing the sites to launch these subsets. They are launching mainly with 3.5 GHz antennas to cover the first areas in the different cities. The expectation is that the number of sites required will grow, mainly when they go with 26 GHz. When this happens, there will be a need of a huge amount of additional sites.

Regarding the number of trials and cities in Europe, the mobile operators seem to be doing well, having nearly 138 cities enabled with 5G. But what is also important is the work carried out with cities. One of the things seen regarding 5G is that in the cities there will be excessive requests from mobile operators to have antennas on every land post, without any coordination. Therefore, Cellnex has worked in a program with Horizon 2020 during the past three years called 5GCity. There has been a dialogue with Italy, Spain and the UK to build a rationale behind the assets that the city can place at the disposal of the mobile operators to build this network.

This project is not just about antennas, but changing the entire infrastructure. As previously mentioned, it will be more about placing things in the cloud and the need for a place where you will have to put your assets in the cloud. There will be a need to put a centralized office in each big city; it will also be about and distributing intelligence. In the end, there will be a need to distribute more intelligence, more capacity, more closure to the users. To do so, there will be the need for more space in the cities (like a cabin in the street or a metropolitan office). That, together with the need of having small cells.

In this project, we are working on the capability of the manufacturers to have small cells, multi-antenna. This is, for example, if an antenna is going to be placed in a land post, it will be ideal to share that antenna, which could transmit a signal for more than one operator. So, we are testing the scenario of two or three operators in the same antenna. Why? Because statistics say that with 5G there will be the need that each microcell; each tower will need 10 single small cells, which constitutes a big amount of deployment.

Regarding diversification, we have seen that operators are implementing 5G first in dense areas. This is because the traffic that those areas generate justifies the investment. Cellnex is already working with mobile operators in this matter, not only with 5G but also with 4G. This is because there are certain scenarios where it is not necessary to have four different networks in a single place and a role of a neutral host where an NTT can implement antennas on behalf of the mobile operator. The four mobile operators or the five mobile operators in the country can share that among themselves and is something that is proven to be successful. We have been doing this in stadiums, such as Milano, La Roma, Juve and we have exported that to Spain, when we bought the Italian company (one in Metropolitano and one in Atletico de Madrid). A couple of months ago, we also built one in Manchester City's stadium because we think that the model where you need to provide coverage to a huge amount of people, but just once every two weeks, yields numbers that don't match. This is why sharing is a good idea. But not only in stadiums; we see that there is an opportunity in theaters, malls, even in hospitals, where there is a need of having specific coverage for patients.



In addition, we see that in Europe, as mentioned before by Patrick, there is the opportunity to cooperate between countries. There is already a definition of corridors across Europe. This shows that the industry is ready to work together between countries to make sure that the implementation works smoothly. Currently, there are about 12 corridors across Europe.

In this matter, Cellnex is trying to understand what the infrastructure of the future is. Regarding what was mentioned: for example, cars will have to have a communication with the network. That network will imply that the mobile operators will have to build a specific infrastructure to cover all the roads in all the countries. The estimation is that every half km. will have one antenna. But sometimes it may not have specific power and in some cases they will have to be “self-contained,” so we are building these prototypes with batteries contained in all the poles working with solar and wind energy to make sure that they are auto sustainable. In this regard, we have foreseen different scenarios and we are testing around them. There is the example of the car, it cannot sense, and if an ambulance is 1 km. away, it cannot hear it. However, if traffic reacts and all the environment reacts, it sends a message, and this will give you the time to go to the side and let the ambulance pass – making the traffic more efficient. Another example is communication with traffic lights. If I know that in five seconds a traffic light is turning red, why keep on accelerating? This will give you savings. These are typical scenarios where a network is needed and mobile operators can support the automotive industry.

Finally, I thought it was important to cover the question of where the member states are in terms of 5G roadmaps. In this slide, you can see that most of the European countries already have a 5G roadmap, and most of them are already providing funding to the stakeholders to work on use cases, to invest in real implementations that will be used in the future by plain users.

I wanted to give you a glance at several examples that we are working on with our mobile operator partners covering all the industries – so industries that we think are relevant and could benefit from technology. Not only customers, because what we see is that the first role of the customers will be the enterprise market and different industries. The first one is agriculture. In Europe, we have enormous lands for agriculture and there are different use cases that we are working on to introduce automatization, identification of fruits, etc. Also, education: there is the possibility of introducing remote education and we see here examples of conferences. But how about introducing holograms or having someone virtually here that we can see from different angles? That is something that 5G will enable, as well. Also, in the security industry, we see that we have the potential – not as some examples in other countries that are more intrusive – to enhance the security of people if we provide police forces with tools for the possibility of security and cybersecurity benefits. They are all related to, and with that I finish, even customers benefiting from going outside their house without having to be physically there. And now with coronavirus, that is a perfect example. We are testing virtual assistants. These kinds of things will be enabled by 5G and these are examples that, because of the funding of different countries investing in these use cases and providing support, the ecosystems are becoming real in Europe.

Speaker:

MS. MAARIT PALOVIRTA

Director for Regulatory Affairs

European Telecommunications Network Operators' Association (ETNO)

I come in representation of ETNO, which is the European Telecommunications Network Operators' Association here in Brussels and we represent the largest telco operators in Europe: 32 operator members at the current date, alongside most of the global telco equipment manufacturers, eight of them as observers. 5G State of Art: we already had

quite a nice introduction by Phillippe and José and I actually have to say that I don't disagree with anything fiercely but I will try to complement this from our point of view, especially from the policy areas that we think that we could still work on together a bit more.

5G is a major opportunity for Europe and for telecom operators. We believe that Europe will need the telecom operators to make it happen. So, the operators play an important role to deliver the growth and inclusion across the 5G ecosystem. Philippe already explained the kind of conceptual idea of what we understand by 5G but from the operator's perspective it is indeed the fixed and mobile infrastructures coming together into one platform, supported by cloud and data infrastructures. This will enable us to deliver new type of services through virtualization and other new technologies. In terms of business, it is a big opportunity and from the end user's perspective. There is also a big potential for us to offer more interesting services to end users, whether it's consumers or industries.

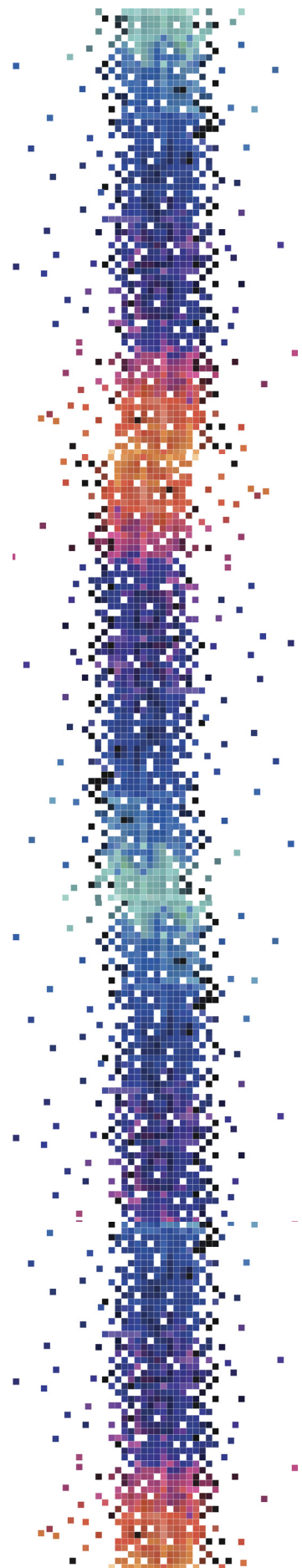
I'm not going to go through the numbers because José already showed a lovely GSMA map on the deployments. But the commercial launch of 5G started last year and I think we had about 20 of them in Europe, most of them coming from the ETNO/GSMA membership. And we expect that this year, and I'm basing my numbers in a study that we launched in ETNO in January done by Analysys Mason³¹, that this year we are expecting 80 new commercial networks to be launched in terms of 5G. So the feeling from the operators' perspective is that we are firmly on the path of deploying 5G. And that it's not a kind of monolithic activity: we are bidding for spectrum auctions, expanding the fiber footprint to complement the mobile networks, and carrying out all these trials that José was explaining about with industry verticals.

On top of that, there is the potential for new things. So we are also assessing and investing in data analytics, cloud infrastructure, to understand the role of operators in that sector. And I also wanted to add energy efficiency as another layer, because of course, with the upgrade of infrastructure, it gives us the opportunity to be more energy efficient. This may also help us to reduce the costs for the operators, in terms of energy costs, as we are trying to improve the case for investment.

In regards to the global discussion of who is leading in 5G deployment and that Europe is lagging in 5G, I don't quite agree with that necessarily. Because if you look at the data, how do you measure success in 5G deployment? Often you see numbers, just measuring numbers of connection. Of course, there are more connections in Asia due to the wider population, and the same in the US. You can't just measure 5G success only based on connectivity. We need to think about the whole ecosystem. Do we have the services in place? Do we have the demand for these services? Are people and industries willing to pay for these services? It's well enough to roll out the network but if we don't have the demand for them, if the consumers are not ready to pay for these new services, or the market is not ready for it, then for private companies such as our members, this is not an interesting value proposition. In the previous session, it was brought up that historically,

the telcom market in Europe is rather fragmented. So the case for investment is, arguably speaking and in accordance to our study on the digital state of 2020, you will see that while European consumers enjoy some of the lowest prices in terms of end user prices of connectivity services, we also don't really have the opportunity to scale. This is because of this national level fragmented infrastructure, which means that investment levels in Europe are lower than in other parts of the world. There is certainly the risk that Europe will be lagging behind if we do not address these issues.

³¹ ETNO. (2020). The State of Digital Communications 2020. Available at: <https://etno.eu/library/reports/90-state-of-digi-2020.html>.



To highlight some of the 5G opportunities for the consumer market and for the industry. Consumers now are the largest customer segment for telcos. According to a recent SISCO report, at the moment telco operators, the consumer market makes up about 80% of business overall in general, as a ballpark figure. Whereas, with 5G there is the possibility that this proportion changes toward a more equal share between consumer and industry. Direct operators providing services through industry verticals through all these use cases that we saw – that is a great opportunity.

From the consumer segment, there is already an increase in demand for data volumes. According to our study, at the moment, for 2018-2019 we experienced an increase of 20% in demand for data usage. This means that there is already an increasing organic demand for more data, which makes 5G more interesting for businesses, but there is still more work to be done.

On the industry side, there is a big interest in the development of these new technologies that will help us develop use cases like robotics, IoT, remote control, virtual reality, among others. Not all the use cases are ready, but ETNO members are already in the process of cause, on the road of piloting different scenarios. For example, in the UK late last year, BT has a 5G commercial network in Birmingham and together with NHS, the National Health service, they are now piloting a project whereby they have ambulances connected to 5G, becoming 5G-enabled ambulances. Then, for example, if there is an accident somewhere, they can already perform an ultrasound diagnostic through the 5G network. So, you have a clinician or doctor in the hospital who, through remote control or partially remote virtual reality, is doing operations during the ambulance's journey to the hospital.

This is something that we cannot do at the moment with 4G networks. And this is really where we see that 5G will be adding value to different industry verticals.

We are making efforts in terms of operators, but especially in the area of IoT, there is a bit more work to do. At the moment, Analysys Mason estimated that operators, with the current business models that we have, will only be able to take up about 15% of the revenues coming from the IoT total value chain. So operators would still be, according to their current estimate, taking only a minor part of this big opportunity that is IoT. So, again more to the point of going to the policy discussions that are taking place here in Brussels regarding the use of data, the EU Commission has just launched the data strategy and that is good news. But then going to the competition discussion on data sharing, data pooling, how can we make sure that we use this data in a way that European operators can also make use of it?

So, what do we need to do to stay at the same pace with the other parts of the world? How do we meet and monetize the demand that we see happening, based on the initial commercial launches?

One of the priorities is investment, as mentioned by Philippe. ETNO members account for about 70% of all infrastructure investment into networks. That is a privilege but also a heavy responsibility on the shoulders of operators so we are really calling for investment friendly and timely execution of the current regulatory framework. First, the code, because we need to make sure that the provisions that were included into the code, such as co-investment, are workable in practice, so we can actually benefit in terms of investment going forward.

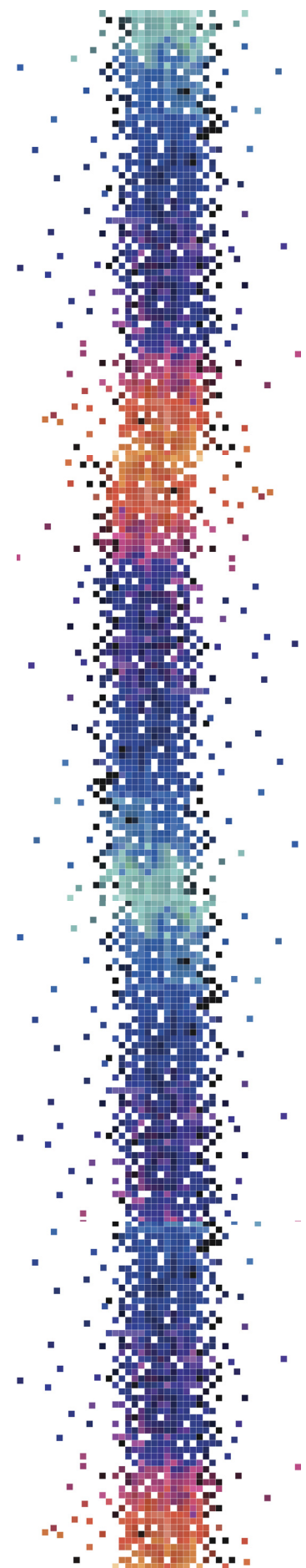
Hopefully, this will be as of January next year, when the code will be transposed into the national legislation of each of the member states.

Second, we need to promote business models and increase collaboration within the industry. Whether it is through network sharing, data sharing or data pooling. Regarding business models, in terms of policy requests and policy actions, we now have quite an open agenda. The digital strategy that was published by the European Commission already gave a roadmap of options on what kind of policy instruments we might be able to use to increase business models and investments. One is the review of the Cost Reduction Directive to review the scope to increase cooperation on public utilities. There are open question marks as to what we can do with this current directive, and then with regards to the guidelines for horizontal agreements – there we also have opportunities.

On the other side, there are the cost reductions. We need to reduce costs and with regards to the spectrum actions, this is a clear thing and we are happy to see that the commission will review the spectrum policy program during this mandate and we hope that new solutions may be found to harmonize the spectrum practices and conditions across the member states. But also at the local government level, where there are still discrepancies, and in terms of granting permits, this can take a lot of time (hence, money for business). So, we need to see if we can harmonize these issues to facilitate deployment of 5G.

Finally, on a third kind of callout, we return to demand generation. We would like to see some aspirational demand side targets. It is good to revise the 5G action plan and the supply side targets, as we all need an aspirational goal. But then, going back to my initial point, we need to see whether we can do something on the demand side in terms of policy. We have large traditional European industries that are not digitized yet, public sector administrations that are not using Information and Communication Technologies (ICTs), we have consumers (perhaps in rural areas) that are not used to using ICTs services. So, how can we help to ramp up the demand? This can be done through various initiatives like skills inclusion, policy frameworks for data enablement, etc. I think it is very important and very interesting day-to-day because the commission will be launching the industrial policy strategy and based on the public leaks that we have in Brussels these days, there are some very important promises there, in terms of reviews of public skills programs or digitalization of European industries. So the key now would be to take this seriously and to put some political will behind them and actually make it happen.

To conclude, the state of art of 5G in Europe: we should aim for world-class connectivity and digital leadership. But it is not only about connectivity, we should think about the ecosystem as a whole, and we as all the stakeholders here today, continue to work together on this and hopefully make progress.



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