Shaping the future 2021

In the framework of the upcoming Global Forum 2021, planned for December 6th & 7th in Muscat, Oman, should the pace of this pandemic subside, three preparatory thematic webinars, featuring contributions, reflections and dialogue among key experts and interested stakeholders, are organized.

This report sums up the discussions of the Global Forum Thematic Webinar I.

Global Forum Thematic Webinar I

March 3rd, 2021

TOPIC 1

Wireless & Wireline Infrastructures: The Upcoming Challenges

The Global Forum Thematic Webinar Ion "Challenges of Wireless and Wireline Infrastructures and Regulatory, Policy, Governance Frameworks in a Complex World" took place on March 3rd, 2021 from 13:30 to 15:00 UTC+1 via Zoom.

With more than 60 participants joining from Asia, Europe and Africa, and the USA and Canada, it was a well-attended, particularly dynamic and highly interactive webinar with intense Q&A sections and lively discussions.

It was the first of a series of three live webinars (the next will be on April 7th, 2021) featuring contributions, reflections and dialogue devised for the purpose of feeding the framework of the upcoming Global Forum 2021.

AGENDA

Topic 1: Wireless & Wireline Infrastructures: The Upcoming Challenges

John Giusti, Chief Regulatory Officer, GSMA

Food for Thought Questions:

- How important is 5G for the digitalisation of the economy?
- What is the role of government in extending broadband access to everyone?
- How do you see wireless and wireline infrastructures being used to support climate action?
- How should governments incorporate network connectivity into its recovery plans and economic stimulus packages?

Latif Ladid, President, IPv6 FORUM

- IPv6-based New Internet empowering Super IoT, Standalone 5G, Data Sovereign Cloud Computing

Questions & Answers

Topic 1: Wireless & Wireline Infrastructures: The Upcoming Challenges

John Giusti, Chief Regulatory Officer, GSMA, opened the discussion on upcoming challenges related to infrastructure by providing a mobile operators' perspective on these questions.

The GSMA is the global trade association of the mobile operators and represents over 750 mobile operators globally.

According to GSMA statistics,49% of the world's population are connected to mobile broadband. Thus, one half of the world population is not using mobile broadband connectivity at all. Less than 10% of the population lives outside of mobile broadband coverage. The biggest issues are not infrastructure, infrastructure investment or coverage, but barriers to usage, such as digital literacy, relevant content in local languages or affordability. Of course, one needs to address the 9% not covered at all, but a lot of progress can be made if we can find ways to get more citizens to participate fully—those who actually could access, but don't for various reasons.

Never has there been a time where digital economy has been so at the front. The COVID pandemic made that parties engage in discussions like never before. We see the power and the potential of a digital enabled world; the worldwide economy continues to operate under COVID restrictions thanks to connectivity and digital solutions. Online platforms and all sorts of mobile devices have helped citizens communicate, connect and consume more than ever. Healthcare and education in particular have pivoted to digital alternatives. And with 5G network deployment progressing, new connected services and the digital transformation of industry are starting to move forward.

As a result, we are seeing a renewed appreciation of digital connectivity, greater government attention, greater policy maker attention and greater industry attention, as well as an increasing understanding of social and economic resilience through connectivity worldwide.

GSMA considers three key areas of opportunities: 1) the area of 5G rollout; 2) how industry can support climate action; and 3) the importance of considering digital infrastructure in post-COVID stimulus packages.

Regarding 5G connectivity, North America is leading in terms of 5G adoption in percentage to its population, whereas the Asia Pacific is leading in overall numbers. According to GSMA 5G deployment projections, China will continue to dominate global 5G connections. With 5G already available across Asia and North America, the majority of new launches continue to be in Europe. Global 5G connections are projected to reach 1.8billion, by 2025.North America, Europe and Asia Pacific will account for 90% of 5G mobile connections forecast globally by 2025.

However, a number of countries are just beginning their 5G journey and it is time to reassess the investment environment to ensure the ability to invest in infrastructure, whether it be incentives for investment or removing regulatory impediments.

The mobile industry continues to experience declining margins, mostly due to the nature of the markets and regulation. Economic recovery post-COVID measures should support an environment where investment can be facilitated, particularly for those countries facing impediments to keeping up in terms of speed of deployment. Releasing sufficient spectrum, reducing sector specific taxation and streamlining rules around network deployment could free up investment in digital infrastructure and lead to new kinds of solutions and services.

Climate change has become a defining issue. Net global emissions have to be cut in half by 2030, before reaching net-zero emissions by 2050.To achieve that goal, the green agenda of the mobile industry relies on the following three pillars:

First, maintaining industry momentum towards net-zero emissions by 2050. The mobile industry has been very focused on monitoring and mitigating their greenhouse gas emissions. Two years ago, GSMA members committed to reach net-zero emissions by 2050 at the latest. So far, there are 60 mobile operators (representing 70% of all mobile connections) disclosing their climate impacts to the Carbon Disclosure Project.21 of those operators (representing 25% of global connections) are on a path to achieve net-zero emissions by 2050 or earlier using Science Based Targets.

Second, the widespread use of smart and connected technologies across all economic sectors. In fact, mobile connectivity already enables a reduction in the emissions of other sectors (about 10 times of the mobile industry's own carbon footprint). This is referred to as the 'enablement effect'—an effect that could double (to 20 times) by 2025, due to the increased prevalence of other connected technologies.

And third, mobile enabled solutions for climate change resilience, i.e., helping low- and middle-income societies adapt. This part of the green agenda implies collaboration (particularly with emerging economies) on how digital technologies can help respond and support the transition to a low carbon economy but also to a climate change resistant one.

The third area of key opportunities to be mentioned are national economic stimulus packages and post-COVID recovery plans. Governments all over the world are devising ways to rebound from the economic crisis caused by the pandemic. The 750-billion-euro recovery fund of the EU, for instance, aims at strengthening the single market but also at adapting to the digital

age, including investing in more and better connectivity, as well as building stronger industrial presence in AI, security, supercomputing and cloud. Such focus on a digital and green recovery seems to be the right path, while at the same time considering connectivity.

Comment/ Question 1: During the pandemic governments have partnered with telecoms providers to subsidize access and data plans for teachers and civil servants. The pandemic has accelerated the reskilling of teachers (and parents). The challenge is to keep investing in broadband (incl. 5G) and not to neglect digital infrastructure as governments face economic problems and hardship due to declining GDP in 2021.

Comment/ Question 2: Experience in some regions indicated that a binary definition of access to 3G or 4G led to sometimes misleading conclusions as the poor quality of the connections made a significant proportion of the 'available' connections in reality unusable. What about the access quality of 5G?

Comment/ Question 3: Asked for more details about the effort to reduce the digital industry's carbon emission and what to answer the strong opposition to 5G?

John Giusti clarified that the transition to net-zero is a pathway, which needs to be specific to each industry. The pathway of the mobile industry will be different from the one of the automotive or broadcast industry. The mobile industry worked with international standards bodies and the ITU on the green pathway to take, starting with climate disclosure. Most mobile connections globally today are provided by operators that are disclosing.

The next challenge is to get the Science Based Targets agreed, which helps to have a very concrete path to get there. Currently, about 25% of the global emissions are covered by the path. The COP26 in November will be an occasion to encourage the industry to do more. For instance, MTN, a South African mobile telecommunications company, just announced two weeks ago their roadmap to get to net-zero by 2040.

The mobile industry has a lot of input from other industries, such as energy and equipment suppliers, that affects the industry's ability to meet the net-zero objective. One big focus of this year is to make sure that these industries are on track.

There are significant 5G deployments, i.e., more than 130 live network deployments globally (Europe, Asia Pacific, North America and the Gulf). The issues people have around 5G and health, are the same issues we had before with 3G and 4G. This issue of electromagnetic field radiation is something that has always been there. There are however problems with social media platforms in the context of conspiracy theories around EMF and health.

The key for the mobile industry is to make sure working with scientific experts to ensure compliance with the international standards. The current 5G deployments are fully compliant, the EMF exposure is even significantly less than people get from other sources.

As mobile networks and 5G are moving to new bands, we need to verify that everything in those bands is within the appropriate safe levels. GSMA We are countering conspiracy theories by communicating as much scientific information from the international community and from independent academics as possible. The issues are really no different than they were with the previous generations of mobile.

Comment/ Question 4: Shared a link to the NSTAC Report to the President on Advancing Resiliency and Fostering Innovation in the ICT Ecosystem

https://www.cisa.gov/sites/default/files/publications/nstac_letter_to_the_president_on_advancing_resiliency_and_fostering_innovation_in_the_ict_ecosystem_2.pdf

Comment/ Question 5: Asked whether the 5G range of the spectrum is different from the traditional 3G and 4G range. If so, the applications would be different. Are we missing opportunities for enhancements at the 4G and 3G levels by focusing uniquely on 5G?

John Giusti explained that we need to separate the technology from the spectrum band. Some of these technologies are working in some of the same bands. A lot of initial 5G deployments have been in traditional mobile bands, i.e., mid and lower frequencies. The spectrum has the same characteristics, it is the technology that gives increased speed, reduced latency etc.

What is new is the question of some of the higher frequency bands. Those frequencies behave differently and this is where a lot of research is going on. Even if the amount of exposure from mobile is so below the kind of exposure we get from other things in daily life, it is important to ensure sound examination of higher frequency bands. At the same time, it is a bit like a chicken or egg: you can't do much real-life testing until you have real-life deployments.

5G is a natural evolution of the other technologies and can be deployed in some of the same bands, but some 5G applications are also looking for higher frequency bands. This doesn't provide higher coverage—it is really about ultra-high speed and low latency in a very contained area. For those applications it is not possible to use the digital dividend spectrum used for broadcasting (which is about coverage, not about high throughput speed).

Comment/ Question 6: Proposed to invite an expert to the Global Forum addressing these issues.

John Giusti would be happy to share some material on this put together by GSMA.

Comment/ Question 7: Underlined the great importance of infrastructure resilience to protect against threats. As we deploy these enabling technologies, we also create a great dependency and great vulnerability. A massive systemic disruption in these infrastructures can be catastrophic for societies all around the world.

Cyberattacks can be very targeted and sustained. Reliance is not something you do once. It needs to be persistently in our minds—just as our health that we consistently maintain and revaluate.

John Giusti agreed. This is a serious danger (which also concerns other forms of critical infrastructures, e.g., power supply).

Network operators are very engaged with cybersecurity, because they have a strong interest in protecting their infrastructure. Experience has shown that they spend a lot of time on cybersecurity, but they don't talk about it so much. During the early days of the pandemic, there were a number of very targeted cyberattacks attacking hospital facilities and for the most part, the networks were able to manage those attacks. As technology moves very quickly, you need the experts within the industries to have very robust defences. A greater involvement of governments and policy makers in cybersecurity can be noticed.

Vulnerable entry points create an additional risk and are a bit harder to manage. There are plenty of new digital technologies that are being deployed from all sorts of companies that haven't been involved in digital before.

Comment/ Question 8: There is a subtle distinction between security (focused on today's attacks, the risks are largely internalized and appreciated) and resilience (focused on emerging threats and unknowns, where the risks are much harder to internalize and plan for, although it can be next-to-impossible to make up lost time as the threats are realized). It's hard for IT vendors to prioritize resilience if their customers are not valuing it. It's hard for political leaders to prioritize resilience if their voters don't value it. It's a serious challenge.

Some sort of regulation is perhaps the only practical way to internalize the costs of not being resilient and the rewards of (cyber) resilience, and incentive resilience-by-design.

Comment/ Question 9: Therein lies the difference between 'band-aid solutions' and serious proactive/preventive measures. The same goes for data protection: the difference between legislating after the fact, or penalizing after the breach, and creating a resilient and safe human-centric data ecosystem.

Comment/ Question 10: This is not just an information systems / network problem—think of IoT connectivity at 5G speeds.

https://www.sae.org/works/committeeHome.do?comtID=TEAG32

SAE G-32 shall utilize and coordinate the knowledge, experience, and skills of technical experts in the field of Cyber Physical Systems Security (CPSS) to:

1. Characterize and address the risk to CPSS, assess vulnerabilities, and recommend System Engineering focused mitigation actions.
2. Share the knowledge of how vulnerabilities are introduced and exploited in cyber physical systems.
3. Document best practices for addressing areas of concern utilizing existing processes, procedures, and standards.
4. Develop a taxonomy for CPSS.
5. Establish standard methods for identifying vulnerabilities in cyber physical systems introduced at any point in the CPSS life cycle and mitigating impacts.
6. Develop validation and verification methods to ensure requirements are addressed.

Comment/ Question 11: Raised the fact that even the World Economic Forum considers deglobalization as current trend. A less globalized world has immense implications for infrastructure and interconnectivity. At the same time, China has made its own Internet and Russia is doing the same. Are we losing the globalised Internet? And what are the implications for infrastructure?

John Giusti answered that one of the big challenges to increase connectivity and inclusion is making locally relevant content more available so that it does become relevant locally and is targeted to local community.

From an infrastructure point of view, the big barrier to deployment is cost, and a fragmented infrastructure (lack of interoperability, bespoke national or regional systems) is going to drive up the cost. It will make it more expensive and fewer people can enjoy the benefits. From an infrastructure standpoint, we have to prioritise global interoperability, standardization and harmonisation wherever possible. There are real risks in this aera—people aren't focussing on the long-term implications, especially for the underserved, if you increase the cost.

Latif Ladid, President, IPv6 FORUM, then continued with discussing the IPv6-based new Internet empowering super IoT, standalone 5G, and data sovereign cloud computing.

We are in the third generation of the Internet. The first one was ARPANET, a research network enabling email. In 1981 the Internet (IPv4) came up, which use was then stopped by the US Government in 1985. The Internet finally took on a more familiar form in 1991.

However, as it uses 32-bit addresses, IPv4 provides a very limited number of Internet addresses (about 4.3 billion) and this address space is completely exhausted since 2011.

The work on IPv6 started in 1995, to ensure that the Internet will continue to function properly. IPv6 uses 128-bit addresses to avoid address shortage and provides a number of new capabilities essential for the deployment of new technologies.

IPv6 restores the end-to-end model, which is fundamental for the many of the applications that we are moving to. IPv6 allows to connect all sorts of things, i.e., billions of devices connected to the Internet, and thus empowers the IoT and 5G.

We are currently not using the full potential of the IoT, because the majority of IoT devices connected to the Internet are going through a certain gateway. IPv6, on the other hand, enables peer-to-peer communication. Things talking to things—this is where the real (r)evolution will happen. Instead of people managing the things, things will manage themselves. This is where a global IoT will happen.

There is a real issue when it comes to cloud computing: The cloud computing as it is used by Amazon was developed by a team in Cape Town, South Africa. The fact that Amazon has an AWS (Amazon Web Services) proprietary stack might compromise data sovereignty. Due to Patriot Act and the Cloud Act, NEC has access to cloud computing data around the world, through Amazon based in the U.S.

As a counterweight to the U.S. cloud computing providers, a number of companies from France and Germany initiated the EU cloud initiative GAIA-X. GAIA-X is meant to bring in new standards and follow strict data protection laws. It will not be undermined by "back doors", which is a fundamental step towards data sovereignty.

In terms of wireless, attention was given rather to some surprise deployments than to the evolution of the mobile network itself: 2G for SMS, 3G for the Web, and 4G for Youtube. Most probably, the same thing is going to happen with 5G and 6G and it will be more the verticals we are going to talk about.

The spectrum used for 4G is below 6 MHz. With 6G we will move to Terahertz frequencies, which are generally considered as innocuous (further testing might be necessary). The THz range has certain limitations: The propagation of THz signals is limited to 10m, they cannot penetrate doors or windows and fail when it rains. Thus, these frequencies are more for indoor usage. For instance, it would be possible to replace the indoor fibre cables in data centers by THz routers.

Currently 2 billion people worldwide are using IPv6 without knowing it.