

The *Mobile World Congress* took place in Barcelona from Feb 27-Mar 2, 2017. 108,000 delegates from around the world came together to discuss all things mobile.

Global mobile subscribers will grow from 4.8B in 2016 to 5.7B, which represents 65% penetration growing to 73% penetration rate, according to GSMA. Facebook's Zuckerberg would be happy to know that 82% of the global mobile subscribers in 2020 will access the Internet on their mobile devices. Meanwhile, the novelty of mobile apps has gone down in the US. Number of app installs has declined 38% from Dec 2014 to Jan 2017, according to Adobe.

Of course, a compelling growth area for mobile operators for the last few years has been a shift towards connecting things and Internet of Things. This trend continues as the mobile networks prepare to transition to Gigabit LTE and fifth generation of cellular networks.

This year's MWC emphasized a less hype-y and more honest look at upcoming 5G networks, as well as the opportunities created by embedding artificial intelligence into "things", be it smartphones, cars, robots or drones. Mobile operators continue their quest to unearth growth business models around IoT, content and new verticals. Operator revenues are expected to grow from \$1.06T in 2015 to \$1.3T in 2025, according to GSMA.

### **Intelligence Powering Future of Mobile**

Masayoshi Son, CEO and Chairman of Softbank, dressed in a Steve Jobs-esque black mockneck, gave a visionary keynote in which he predicted that super intelligent chips - equivalent to a human brain with an IQ of 10,000 - will be developed in the next 30 years. He believes in singularity concept that chips equivalent to a human brain will be coming somewhere around 2018. The super-intelligent chips embodied in moving robots will be capable of doing things we can't even fathom now - hopefully in support of humanity. Others like Chang-Gyu Hwang, CEO of KT also emphasized importance of AI along with big data as a key driving force of fourth industrial revolution, albeit on a more grounded tone. Telefonica's CEO, Jose Maria Alvarez-Pallete, introduced his company's Aura AI platform capable of natural language processing for listening and talking similar to Amazon's Alexa.

Others argued that security and privacy are paramount issues to address in order to gain customer's trust in AI technologies.

### **Road to 5G has Few LTE Stops**

Rajeev Suri, Nokia's CEO, described how 5G will power the fourth industrial revolution. 5G will enable a plethora of new use cases that can be categorized into three areas: hyperlocal (serving intense demands of crowds in major events), hypermobile (such as connected cars) and hyperscale (supporting industrial Internet and connecting billions of devices). Nokia also announced 5G First - an end to end solution for early-adopter operators that want to deploy 5G based on Verizon's 5GTF specifications.

While 5G's low latency and 30-40 times higher throughput enables many new applications, there is still plenty of runway for LTE. Operators might also want to use a stepwise progression towards 5G to ease the deployment pains both in terms of technology and just as importantly new business models that are enabled by new technologies. LTE 4.5G Pro provides a 1Gbps peak data rate along with latencies of several msec's and LTE 4.9G will provide a few Gbps peak data rates and lower latency which will provide tremendous capabilities and as a fall-back to allow for continuity of service in future 5G networks.

Standard 3GPP 5G deployments (aka standalone 5G NR) are expected to be deployed in 2020. To put things in perspective, it took LTE 6 years to reach 23% penetration of global connections (excluding M2M) and by 2020, LTE will power 41% of global connections. GSMA predicts that 5G Era will start in 2020 and by 2025, there will be 1.1B 5G connections, representing 12% of all mobile connections.

### **IoT, Connected and Autonomous Cars, and Smart Cities**

There were plenty of IoT use cases on display at MWC. Softbank's CEO predicts there will be 1T IoT connections by 2035. In Innovation City area of the show, several trials showcased NB-IoT(3GPP's radio technology for LPWAN - Low Power Wide Area Network) including connected seals by Sea Mammal Research Unit of University of St Andrews in Scotland, and connected containers by Veolia that help with smart city's waste management. Deutsche Telekom announced it will roll out commercial NB-IoT in Germany in Q2 2017 followed by launches in other European cities.

Meanwhile, LoRa Alliance announced widespread support for its roaming standard so IoT devices can communicate across multiple LoRa service provider networks.

Not surprisingly, Connected Cars and autonomous vehicles were another big trend at MWC. Ford showcased a smart city concept: Autolivery service where your grocery order can be dropped off using self-driving trucks for the major part of the transport and then passed to Drones for delivery to your apartment in a skyscraper. Watch out Amazon!

Roborace introduced Robocar, a self-driving race car with top speed of 199mph (320kph). It senses the world by five LiDAR sensors, 18 ultrasonic sensors, six AI cameras and GNSS positioning. Its brain is powered by Nvidia's Drive PX2 - the open AI car computing platform capable of 24 trillion AI operations per second. The company plans to have future races in which teams of AI developers put their software to test=race against each other on Robocars.

Interestingly, Uber seemed to be downplaying the autonomous car market warning us that these are very early days.

Three key themes for IoT continue to be: partnerships, partnerships, and partnerships.

### **Mobile-First Video Strategies**

Vivendi's CEO, Arnaud de Puyfontaine, talked about the trend of millennials watching video on mobile devices more than 50% of the time and how his company is responding to that trend. They are introducing Studio+ which is creating premium mini-series designed specifically for mobile devices. Each mini-series comes in ten 10- min episodes.

John Martin, Chairman & CEO of Turner, discussed how they are making massive investments in technology in addition to investments in programming to create great user experiences. Mobile video is an "enormous opportunity" for them and the fastest area of video growth. In both their news (i.e. CNN) and sports, they are transitioning to mobile-first programming.

Both Vivendi and Turner stated that they need scale in their distribution channels to make the economics of content work. However, they are going about acquiring scale differently. Vivendi is seeking partnerships and joint ventures with operators and other distributors. On the other hand, Turner, as a member of Time Warner group, is looking forward to supercharging its distribution with AT&T pending merger approvals.

Vice Media's CEO, Shane Smith, said the AT&T-Time Warner merger is a disruptor to the industry, implying it would have a domino effect on the other players.

Reed Hastings, CEO of Netflix, envisioned a day where there won't be any buffering when watching Netflix on mobile or laptop or TV. Say no to spinning wheels of video!

### **Phones of MWC**

Nokia phones are back through Nokia's partnership with HMD Global. The iconic Nokia 3310 resurrects, this time with 22 hours of battery life. Nokia 3 and Nokia 5 phones add to Nokia 6 to complete the line of mid to high end smart phones powered by unadulterated Android Nougat.

Sony announced the Xperia XZ Premium, first smartphone with 4K display and HDR (High Dynamic Range for sharper colors) and very cool super slow motion video camera. Sony also introduced the Sony Xperia Touch projector that turns any surface into a touch screen surface which was innovative and expensive at \$1600.

LG introduced its G6 high-end smartphone with Dolby Vision and Google Assistant that will be carried by most of US major carriers. LG G6 will be Sprint's first smartphone with High Power User Equipment (HPUE) technology. HPUE boosts coverage of TD-LTE band 41 (2.5GHz) and uses massive MIMO. Sprint, which defines HPUE as High Performance User equipment, says HPUE will improve phone's coverage and throughput.

Humbly, Samsung did not launch its expected Galaxy S8 at MWC and only announced a launch date of March 29<sup>th</sup>.

### **And One More Thing... (maybe three more!)**

There were some interesting AR/VR demos but frankly, CES was better suited for all kinds of mixed reality exhibits. Facebook's Telecom Infrastructure Program (TIP) announced two BT acceleration centers in UK, where collaboration among operators and startups can take place. Mobile payments market is growing fast and the industry is working on lowering the friction and improving user experience.

**Disclosure:** Azita Arvani runs Innovation Partner & Venture Management at Nokia. This report does not reflect Nokia's views.

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