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Connectivity for a Gigabit Society¹

Digital transformation holds the key to unlock future growth.

Also in Europe, the digital transformation of enterprises and society has in fact enormous growth potential. European industry could exploit its strengths in advanced digital technologies and its strong presence in traditional sectors to seize the opportunities offered by technologies like the Internet of Things, artificial intelligence, big data, advanced manufacturing, robotics, 3D printing, block chain technology. This will also enable the industry to acquire a stake in emerging markets for the products and services of the future.

As you know, digital transformation is characterized by the use of advanced technologies and the integration of physical and digital systems, by the predominance of innovative business models and new processes and by the creation of intelligent products and services.

European Union promotes the Digital Transformation. Through dedicated programs and targeted financial support, the future long-term budget of the EU will help to bridge the EU's digital investment gap, including in remote and rural areas. It will tackle digital challenges, from artificial intelligence to the promotion of digital skills, from personalized medicine based on supercomputer calculations to the capacity to equip Europe against cyberattacks and cybercrime.

This policy may seem superfluous, since we are already completely addicted to digital technology in our daily lives. However, when it comes to the digital transformation within the workplace, we still have a long way to go. This is true of course all over the world: since digital technologies are constantly being improved, it is highly unlikely that we will ever reach a point at which the transformation will be complete.

¹ Key note speech, Huawei Eco-Connect Europe 2018, *For a Digital Intelligent Future*, Rome, La Nuvola, November 8th, 2018.

For Europe, however, there is some more criticality or complexity: in Europe, today, too many EU businesses are not yet able to take full advantage of these advanced technologies or innovative business models offered by digital transformation. Of course, the progress of industry digitization varies from sector to sector, particularly among high-tech and more traditional areas, and between countries and regions of the EU. There are also large disparities between large companies and SMEs. However, as a whole, European industry remains behind the United States and China in adopting advanced business models, in particular digital platforms.

In 2016 European firms accounted for just 4% of the global market value of platform businesses (companies like Apple, Amazon, Alibaba, Uber and Tencent). China had a 24% market share and the US 70%. As you know, companies with platform-enabled multi-sided business models significantly outperform those with predominantly one-sided product or service centric models, in terms of growth rates, return on assets, margins and valuation multiples².

But none of these global leaders originated in Europe. So, right now, Europe is trying to keep pace with the United States and China in the tech race.

I am confident that we can catch up. But I strongly believe that the success of the digital transformation in Europe cannot be taken for granted.

It will depend on the full exploitation of fourth drivers:

- *first*, connectivity: that is the full development and deployment throughout Europe of the latest generation telecommunications network infrastructures (FTTH, 5G), fit to ensure the level of connectivity required by the forthcoming Gigabit society;
- *second*, the complete implementation of the EU Digital Single Market;
- *third*, a stronger and more structured cooperation between European industries and advanced industries outside Europe

² Platform-enabled, multi-sided' means that a significant proportion (15% plus) of the company's overall business model – the way it creates value for customers and captures value for itself and where it invests its capital and management attention - relies on it acting as an intermediary between multiple parties of consumers and producers. These businesses are asset light and they succeed through generating 'network effects'. This means that their 'product' gets more valuable the more people who use it. Looking at market value, seven of the ten most valuable companies in the world today operate this type of business model. These companies are: Apple, Amazon, Google, Microsoft, Facebook, Alibaba, Tencent.

- *fourth*, the permanence and development in the world of a free, open and competitive market economy, now threatened by the commercial policies of the Trump Administration

TLC networks for the forthcoming Gigabit Society

The Digital transformation has proven to be one of the most important enablers of social change and economic growth of our time. Gigabit connectivity is the key enabler to foster the digital transformation of Europe.

Delivering on its Digital Single Market strategy, the European Commission adopted on 14 September 2016 a set of initiatives and legislative proposals to place the EU at the forefront of internet connectivity.

To meet future needs of broadband, the EU Commission has proposed that by 2025:

- all schools, transportation centers and the main providers of public services should have access to Internet connections with speed of download/upload of 1 Gigabit of data per second,
- all European households, rural or urban, should have access to networks which offer a download speed of at least 100 Mbps, and are fit to be upgraded to 1 Gigabit and
- all urban areas and major roads and railways should have broadband uninterrupted coverage

The European Commission strongly communicated its view of the main pillars of European recovery in its communication concerning the Gigabit Society: 5G and FTTH networks are at the center of this revolution, together with cloud computing. Vertical applications based on Network Slicing need to be connected:

- to a full fiber network, covering the whole territory and with high redundancy, in order to guarantee low latency, high bandwidth and reliability for all the applications;
- to a distributed cloud computing architecture, enhancing the ability to process data and react in real time.

5G and fiber networks are complementary, and their development has to be planned from now in order to ensure that a full fiber network reaches all 5G

antennas. This will, in turn, enable the development of AI Systems based on Big Data and Cloud Computing.

Only if these enabling conditions are met, the full range of applications based on 5G will be able to deliver the enhancement of social and economic life they've been promising. We must therefore ensure that these conditions will be met in all our territories, in cities and in rural areas, in touristic villages and industrial sites, with no one left behind. Only if these conditions are met, we may make our systems evolve, benefitting from a full switch off, from analogue to digital services in all the relevant areas of our lives (e-health, e-agriculture, e-government, banking services and electronic payments, insurance, physical security and accidents prevention, monitoring, ...), and generating an increase of the overall welfare and the expected reduction of public and private expenditure generated by the increase in factor productivity

We cannot create new digital divides, that would have much more exclusionary effects than the ones we've experienced in the past. We cannot provide healthcare services only to the citizens in big cities, or guarantee assisted/autonomous driving only on selected routes. A new form of universal service is needed, the full coverage of our territories.

We should moreover remember that data for about 2.5 quintillion bytes are now being created each day this month. The volume of information swirling around the globe is growing at a steady pace, despite slowing Moore's law. There is one certainty: more and more fiber will be necessary to respond to the voracious appetite for this data to be readily available at high speed.

In particular, the three main future developments in our sector, that are being discussed today, will be made possible by fiber optics:

- Ultrafast broadband, made possible by fiber optics, provides the answer, with download speeds of around 1 gigabit per second.
- The 5G's performance goals depend heavily on the availability of lots and lots of fiber to cell sites. Put simply, you can't have advanced 5G wireless without fiber optic lines everywhere.
- As IoT devices spread exponentially, quick, reliable fiber optic cable infrastructure will be crucial to the success of the interconnected world. But also, for smart cities, and AI Technologies like Machine learning and deep

learning, which are automating in-depth analysis of a huge glut of structured and unstructured data. Given the enormous volume of information that will need to be digested quickly to create intelligence, FTTH, 5G and cloud will be crucial enablers.

Gigabit Connectivity are therefore key for the competitiveness of our economic systems. The European Commission acknowledged that *“a growing number of businesses and industries, particularly digitally intensive enterprises, will need Gigabit connectivity to create new applications and business models to produce, distribute and sell their goods and services more competitively.”*

This assessment is clear. But we need now to deploy these high connectivity networks. In this process, FTTH and 5G network deployments are complementary and their development has to be planned together, in order to guarantee that a full fiber network reaches all 5G antennas and to make this investment valuable both for fixed and mobile services. At the same time, the possible integration of fixed and mobile infrastructures into a single, double face network infrastructure eliminates risk of future demand split between fixed and mobile service provision, as well as the risk connected to the potential competition between these two ways to access the network.

In this framework, wholesale only operators play a specific role. They have showed a significant ability to put in place huge investment plans to build FTTH networks and fund them on the financial markets. The main reason is that wholesale only players build a network to accommodate all market players. They achieve very high economies of scale and have the incentive to transfer this benefit to all market players, in order to speed up the take up of the network. At the very end, a wholesale only operator is the best way to achieve the maximum level of cost sharing, since the same passive infrastructure can be shared among all market players.

The EU has acknowledged the special role of wholesale-only operators by the art.77 of the new TLC Code. Such operators, not involved in retail activities, are today only present in Sweden, Italy, UK, Ireland and in a few other European countries. But in the future, they will likely operate in all Member States. They have in common that they invested in FTTH networks from scratch. But their costs are lower than those of operators with complex, upgraded hybrid fiber-copper or fiber-coax networks, and

they do not have the heavy legacies of obsolete copper networks, of high debts, of excess staff, and of shareholders unwilling to finance long-term projects.

This evolution could lead, in some countries, to a re-monopolization of the distribution networks, through mergers between the networks of former incumbents and new fiber networks. Such move would reduce the risk of having duplication of investment in most dense areas and no investment at all in less dense and rural areas. A single operator serving the whole market of retailers has all the incentives necessary to extend coverage and guarantee a geographically averaged access price, favouring the development of a strong competition among service providers that can make the whole society benefit from the higher diffusion of services. By moving in this direction, the society will not bear the costs of duplicated assets and will benefit from the higher coverage of networks and services.

Furthermore, we have to consider that in the same time frame also investment in 5G mobile communications networks is expected to take place. Given the cost of deploying the future 5G networks, and in particular the fiber optic backhauls to the very dense network of antennas, full infrastructure competition in mobile (which developed among the leading service providers in the GSM area) would be inefficient and perhaps even unsustainable, except for the largest mobile operators. In addition, the classical scenario of competing and interconnected networks, managed by different operators, will soon be unable to guarantee the performances in terms of latency required by 5G applications. On the contrary, the “wholesale only” model will naturally support the evolution of the 5G networks towards a “sliced structure”, managed by a single operator and optimized to satisfy the service needs of each vertical application (e-health, automotive, power systems).

Infrastructure competition would also lead to less consumer choice because smaller operators would not have the means to deploy networks throughout the countries concerned. In Italy, several OLOs. They have understood that it makes no sense for each operator to deploy its own network all over the country, with the risk of the service not being taken up: they would own the spectrum, not the fiber network.

To sum up, if we want to have pervasive, ultrafast broadband coverage, we must make optimal use of economies of scale and scope. In parallel, regulators and governments need to address the conflict of interest of the incumbent operators. A split of incumbents into, on the one hand, a netco and, on the other, a service

company, could be, in some countries the best solution to ensure that the right investments incentives are present.

Europe could therefore boost investment in both fixed and mobile network by supporting and speeding up the evolution towards the wholesale only model. This is, at the same time, the best way to include investments in ultra-broadband networks in the asset class of infrastructure, alongside highways, railways, ports, airports, electrical networks, gas networks, attracting capital provided by institutional long-term investors.

The EU Digital Single Market

In the EU Commission's view, the full realization of the Digital Single Market is in itself the first condition for the digital transformation of the European economy, allowing the development of the technological competition in a market not segmented within the suffocating boundaries of the individual European countries and therefore in a market of a size comparable to that of the major economic powers.

The Commission proposes open platforms and 'common data space' for artificial intelligence to be made available across the EU in digital innovation hubs, providing testing facilities and knowledge to small businesses and local innovators. Digital Innovation hubs are today one of the key elements of the *Digitising European Industry strategy*. Under the *Digital Europe Programme*, the Digital Innovation Hubs would act as a one-stop-shop, providing their customers with access to digital technologies and competences, infrastructure to experiment with digital innovations, training to develop digital skills, financing advice, market intelligence and networking opportunities.

Promoting the digital transformation through hubs and digital training is essential. As you well know, the digital transformation of a company is much more than setting up a fantastic website or to be active on social media. In fact, the digital transformation consists of 20% technological innovation and 80% cultural change, quoting the strategy expert Peter Drucker's *Culture Eats Strategy for Breakfast*.

Many people fear that their jobs will become redundant if innovations are implemented. Rather than resisting the digital transformation, people and organizations should invest time and efforts in acquiring new skills to be able to cope with constantly changing and evolving technologies and applications.

Training and digital skills are therefore one of the top priorities in the Commission's 'Digitizing European Industry Strategy'. An expansion of the digital skills gap would have a dramatic impact on the ability of businesses and Governments in the EU to fully benefit from the opportunities offered by the digital transformation.

Cooperation between advanced industries inside and outside Europe

The investment will be huge: optical fiber cable, active equipment, applications. The number of suppliers is important in some of these markets, less in others. There are many standards. At first glance, in many areas more cooperation seems required to avoid that we would end up with very high connectivity networks in the different EU member states that are not compatible, reducing the potential of scale effects. Cooperation should however not be limited to Europe.

I see major cooperation opportunities with Chinese providers, in particular for start-ups and scale ups that are developing the future services that will thrive thanks to the high connectivity networks. The experience shows commercial cooperation between Chinese vendors and European companies can constitute win-win solutions.

In addition, AI Technologies like Machine learning and deep learning require huge amounts of structured and unstructured data, to be trained and ensure relevant outcomes. Given the enormous volume of information that are required it is indispensable that EU companies get access to the huge volume of data generated every second in China, in one way or another.

This huge volume of information managed on both fixed and mobile (5G) infrastructures raises security concerns for our European Member States, that consider their proper management crucial for social, political and economic reasons.

A strong cooperative framework should therefore address these security concerns, in order to guarantee the full respect of the security standards that European Countries consider appropriate for network security and data management. We expect that our technological partners comply with all security standards which are and will be defined in Europe.

An open and competitive market economy

Competition is the main driver of innovation and investment in the digital sector. Managers know that they have to innovate or risk eventually to disappear at the benefit of more innovative competitors. It is the competitive pressure that is bringing about the switch over from analogue to digital services in all the relevant areas of our lives (e-health, e-agriculture, e-government, banking services and electronic payments, insurance, physical security and accidents prevention, monitoring, ...), and can produce an increase of the overall welfare by increasing factor productivity.

For digital transformation and technological innovation, it is therefore crucial to defend and implement the free market and the fair competition on a global levelled playing field, governed by rules set by international organizations with the participation of all countries on an equal footing. Fortunately, China and Europe share this commitment to the defense of an open economy and the free market

Of course, a free, competitive market does not exclude State intervention, in particular for the development of strategic infrastructural networks capable of producing significant positive externalities for the growth, competitiveness and social cohesion of the whole country. For example, the State can provide incentives to attract private capital and ensure that the needed investment should be made in due time. However, such public intervention should be limited to areas where private investors can not earn an adequate return and no investment would occur in the absence of State intervention.

Moreover, a renovated or enhanced public role in the management of the digital infrastructures could be justified by the security needs I just mentioned as well as by the aim to guarantee the universal right to Gigabit connectivity and to ensure the fair competition between the service providers.