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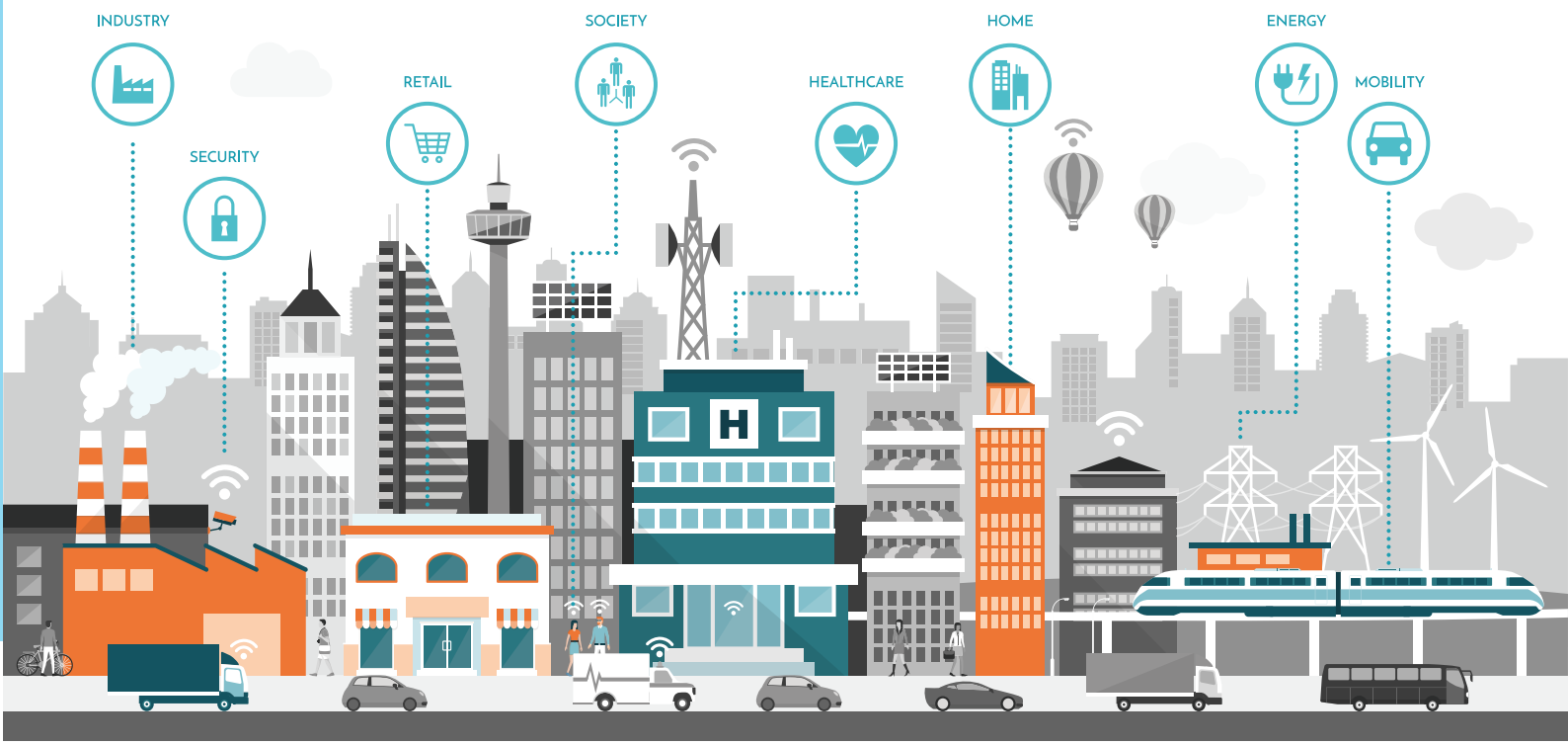
A Brave New Ultra Connected Society

The 5G (r)evolution

A Brave New Ultra Connected Society

Digital transformation keeps gathering pace all around us and it will continue to do so in the coming years, affecting more and more how we live, work, make a living and, in fact, how the whole of society functions



Digital transformation is disrupting every industry & sector supported by the explosion of connected devices (IoT), the ever-increasing use of video and intelligent things & applications, with low latency requirements.

As per a Gartner research, in 2021 the total end-user spending in digital services will reach USD442 billion worldwide with a Compounded Average Growth Rate - CAGR of 13.8%. This spending is spread across a high number of sectors like Utilities, Transportation, Retail, Manufacturing, Insurance, Healthcare, Government, Education, Communication & Media, Banking.

In this growth ecosystem, digital enterprises will spend up to 10 times more on digital services than consumers, in particular in Manufacturing & Natural Resources verticals (USD190 billion in 2021), as well as other rapidly growing segments: Transportation, Healthcare and Government (~ +11% CAGR between 2018 and 2021).

To accelerate the pace of adoption, Commerce Service Providers - CSPs need to define the right monetization models, which should take account of corporate value and customer value and willingness to pay, and to invest in digital network infrastructures to foster agility and faster time to innovation, enhanced security, greater operational efficiency and simplicity.

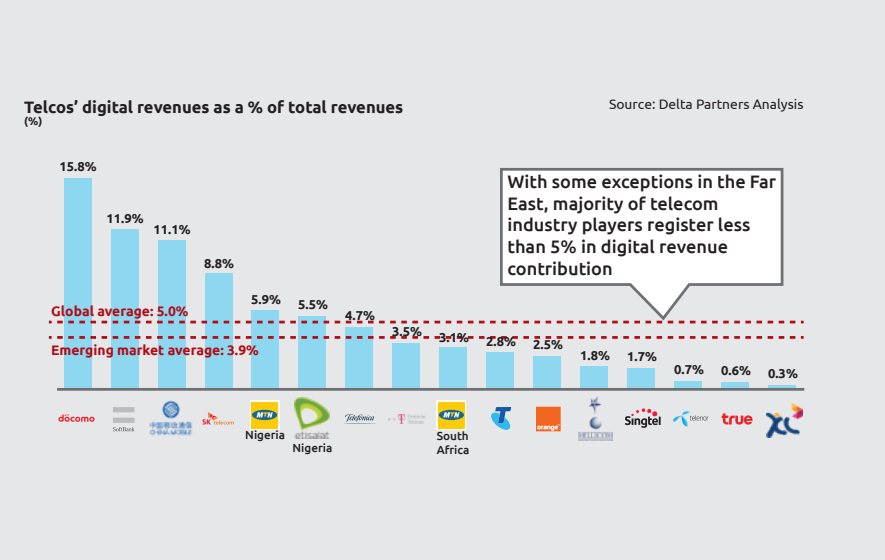
> ***Digital Transformation would be a mantra from 2017, as Telcos need to transform themselves before they truly become digital service providers***
>
> ***– Frost & Sullivan***

5G as key technology enabler

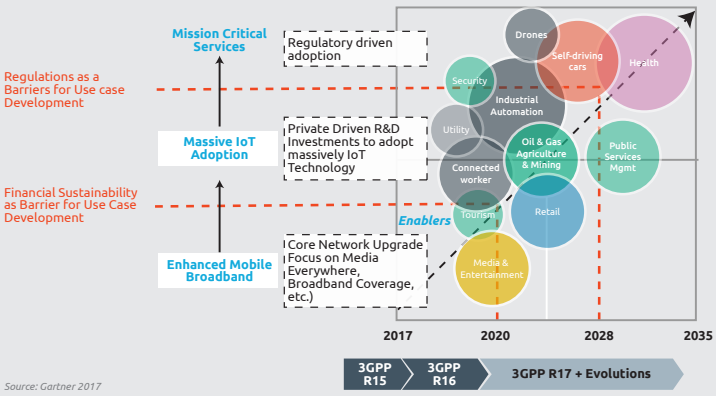
The Global Communications Industry Market is stalling at USD1.8 trillion due to saturation and competition from Over-The-Top - OTT players. This has been impacting Telcos' shareholder value over the last 5 years. The gap with technology vendors is widening as Telcos struggle to extract value out of services.

But if, from one side, Telcos claim to enable digital business through a network digital-ready offering, on the other side, digital services are just a minor fraction of total revenues: on average ~5% of total revenues; their share expected to double up by 2021.

Ericsson, in the latest Telco for Italy summit, declared that the 5G Operator Business Potential at worldwide level as key enabler of Industry Digitalization is forecast to USD15 billion. Moreover, by 2030, the total ICT investments for Industry Digitization is estimated in USD81 billion and 39% of that is 5G enabled digitalization investments.



5G is representing, at that point, the technology transformation wave that can enable Telcos to become centric in the Digital Society. It creates a high performing, adaptive and programmable, pervasive connectivity engine that can efficiently serve the future needs of consumer and industries.



5G is going to be the first service-oriented designed network: this is providing the ability to design use cases specific for each industry taking into consideration three main criteria: data rate and capacity, latency and mobility.

The main barrier to 5G use case roll-out is the standard evolution that foresee only within the R17 (publishing date to be confirmed, expected 2025) the support for mission critical services

Examples of different needs for different vertical segments are:

- Media & Entertainment could benefit from enhanced capacity to provide new viewing experience (immersive 360° video, 8K streaming, massive video upload);
- Industrial automation as well as smart retail or smart grid have the need of low latency and/or massive sensors connection but in a context of low or zero mobility;
- Self-driving/remote controlled cars or drones, healthcare services (assisted/remote surgery) have the need of high data rate, very low latency and very high mobility.

5G Adoption Strategy

The stuck in Capital Expenditure – CapEx investment caused by the drop in revenue and margin is pushing Telcos to understand the real value of the services enabled by 5G in order to have the right monetization model in place.

The 5G roadmap develops across 3 dimensions:

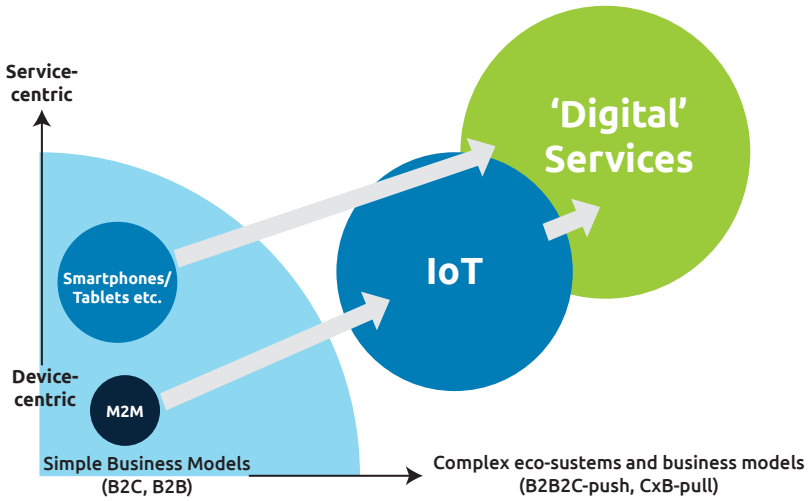
Re-invent business models & value proposition
building a cross-industry ecosystem in order to develop digital offerings enabling 5G monetization

Build (r)evolutionary approach to infrastructure investment
exploiting the power of Artificial Intelligence - AI and automation in conjunction with new infrastructure investment strategy (lean-in, network sharing) to build an efficient service-oriented network

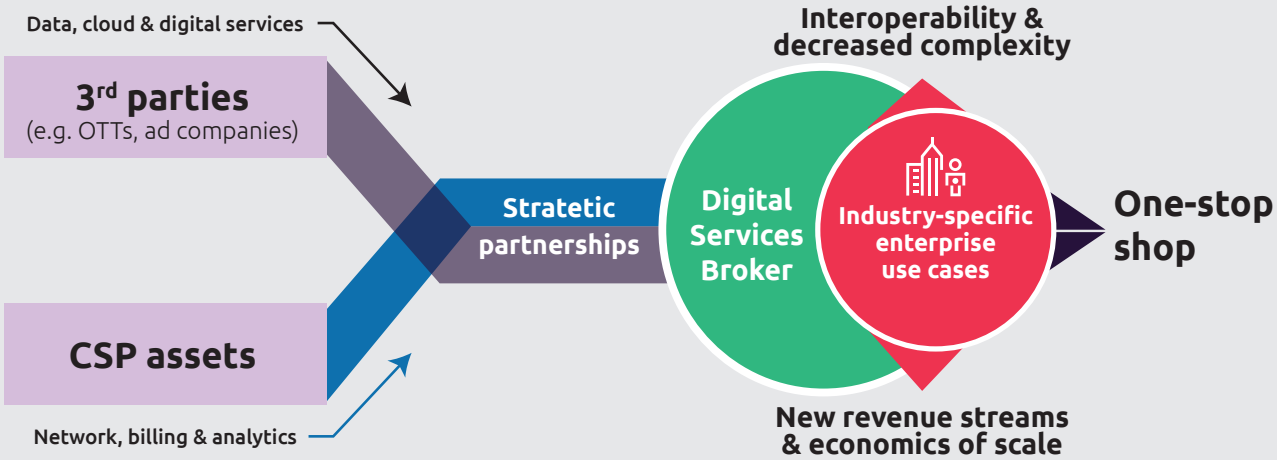
Collaborate with Governments and regulators
planning at micro-market level defining an ad-hoc spectrum and access (towers, backhaul, etc.) strategy as well as lobbing to secure a front-row sit in the digital society

The natural role for Telcos can become aggregators/brokers of 3rd party services creating digital ecosystems that enable new revenue streams, coping with the challenges of their business:

- Monetize existing CSP assets (network, billing, analytics);
- Improve brand positioning and awareness and differentiate portfolio;
- Build new billing relationships with 3rd parties customer base;
- Leverage existing CSP customer base to build new partnerships with 3rd parties



Providing value by becoming a one-stop digital service broker leveraging the 5G network to enable advanced business models.



Technology Impacts and Roadmap

5G will be the first services-oriented network from its inception. Its mantra will be Distributed, Pervasive and Programmable centered on customer experience. We are moving from a hierarchical network, where functions are placed along a predefined traffic path, to a flattened network, where functions and traffic are where customers need them.

3GPP TR 38.913 standard targets are very demanding in terms of:

- **latency** (10-0,5ms), for mission critical applications;
- **bandwidth** (up-to 20Gbps Downlink), for enhanced Mobile Broadband – eMBB;
- **connection density** (1M devices/km2), for massive Machine-Type Communications – mMTC.

To sustain all of these requirements, the technology (r)evolution will bring a number of new or enhanced features such as Control Plane (CP)/User Plane (UP) decoupling, Hetnet, Massive-MiMo. Such changes aim at improving very specific aspects of radio access connectivity, and all together will transition mobile networks into the 5th Generation, nonetheless they will be introduced opportunistically in radio networks by service providers, fulfilling monetizable use-cases.

The spectrum is a scarce resource and auctions around the globe are running at high price tags for its acquisition. The 5G pioneer bands are: 700MHz, 3.4-3.8GHz and 24.25-27.5GHz. In some countries (e.g. Italy, France, South Korea) the price paid per Point-Of-Presence - POP in a typical holding on the 3.4-3.8GHz bands is up-to 3 times higher than other European countries. This might slow down actual network roll-out due to shortage of cash resources in Mobile Network Operators - MNOs budgets after spectrum acquisition. Auctions expenditures, 4.5G still-very-good networks and a network cloudification running not quite as fast as expected make the case for a cautious and surgical roll-out, based on monetizable use-cases.

5G service-oriented core network will help operators enable all access and all services and obtain 5G commercial success. It will be serving various industries with autonomous driving, industrial controlling and Augmented Reality - AR/Virtual Reality - VR. Moreover, 5G standard indicates that the user equipment can connect simultaneously to multiple slices (hence multiple data core networks) to exploit different services.

Service-oriented core network solution drives the (r)evolution of telecommunication networks in the following ways:

- **Enable access to agnostic networks** – Agnostic access enables service continuity between different access modes and ensures seamless user experience
- **Drive the network to distributed architectures** – 5G network functions will be distributed on demand. Through Control/User separation, network user planes can be deployed to the network edge to fulfill inspired user experience
- **Drive network functions to on-demand services** – Service-oriented Core network will decouple network elements according to several micro-services. Each service can be deployed and updated independently, orchestrated to meet new requirements quickly
- **Intelligently distribute network resources and capabilities** – Service-oriented core network will build separated slices according to the business requirements for vertical industries. Not all capabilities will be required in every slice (e.g. mobility management)

5G networks are going to be positively "complex" and will require a very high degree of automation and precise orchestration capabilities to run smoothly and fulfill promises to every industry segment they will be serving. Telecommunication operators will require strong technological partners to sail straight to successful evolution in the next generation of networks.

Conclusions

The need to evolve to a full digital society model is creating new requirements for the foundation layers that will support its growth.

Telcos are forced to support new type of services: pushing to a level of quality that the deployed technology is not able to provide, and move to a network that allows more agility and faster time to innovation, better security, and greater operational efficiency and simplicity. A Network Digital-ready.

On the other side, these new requirements can move back up Telcos in the value chain offering, re-invent business models & value proposition towards:

- a more solid collaboration with governments and regulators;
- the creation of a solid ecosystem that will provide a comprehensive digital market place to Consumers, Government, Enterprise, Wholesales.

In terms of technology, if the move from 3G to 4G was an evolutionary one, the move to 5G will be transformative. New access technologies, a new paradigm for the core network (from heterogeneous to flattened), the need of advanced automation and cloudification will impact every dimension of the Telcos (processes, technologies and organization).

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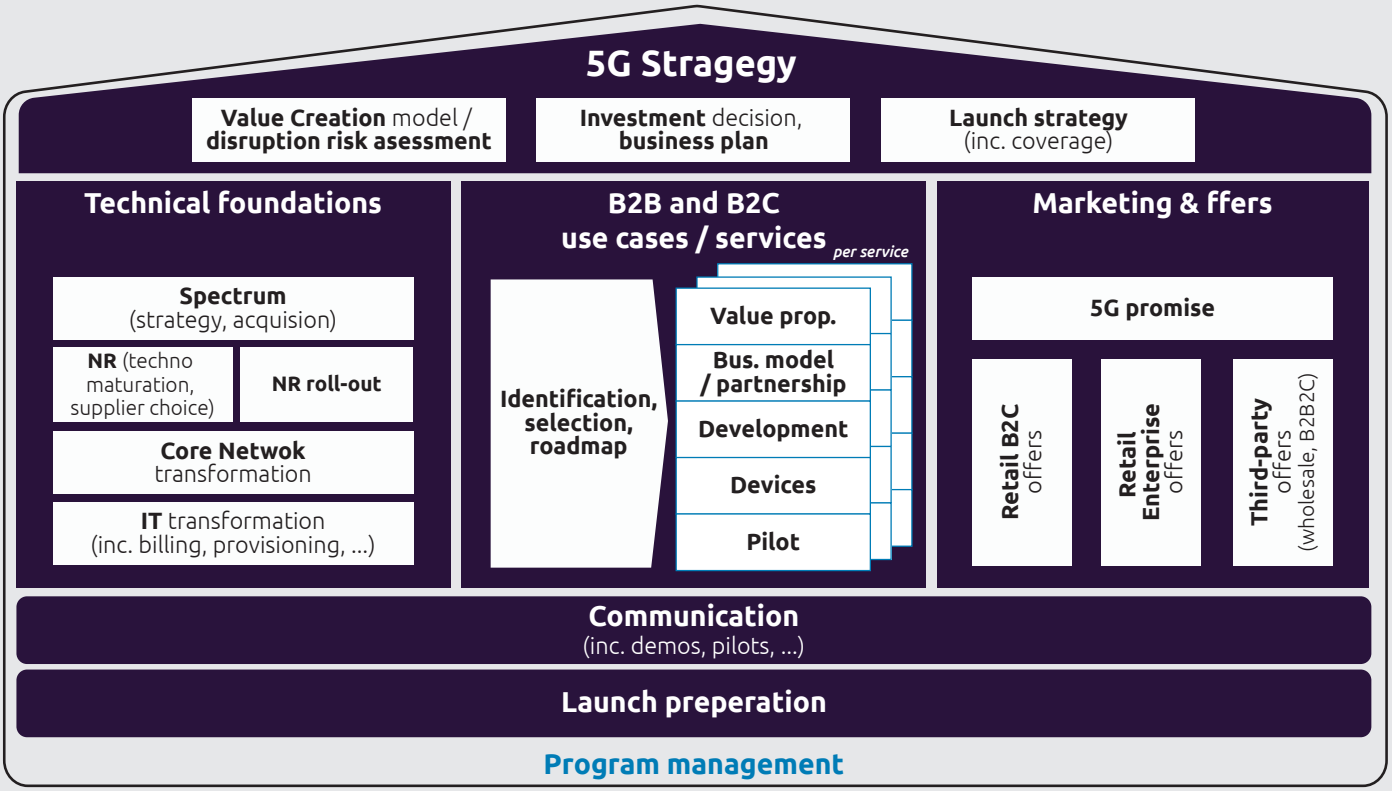

Get support from Capgemini 5G reference frameworks. This helps you define a clear strategy and vision within a disrupted ecosystem, along with a set of service offerings – capabilities, platforms, solutions, and services to fulfill your needs.

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