

**TF.2 on enabling technologies for (vertical) ecosystem transformation and federation,**  
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Under the scope of entire society digitization, a universal and ultra-high performance ICT infrastructure is considered as the essential foundation to support the demands from individual users as well as from the so-called vertical industries. While 5G was successful in breaking the ice with regard to the integration of new types of usage and new user communities, real vertical industry market penetration is yet to come for telecommunication players. When we begin to focus on the next step that is beyond of 5G (B5G)/6G, it is essential to consider which kinds of enabling technologies may become the cornerstones of the next generation of mobile communication system, especially the ones from the emerging tech trends. This taskforce is expected to perform deep-dive on the following candidates (but not limited to):

**New system architecture concepts**

Trends in industry moved from mass production to mass customization, leading to new technologies and production methods. When we look at mobile communication system, from 4G to 5G, the evolution in telecom industry went through a similar trend, enabled by slicing: from mass connectivity provisioning to per service level customization. Mass customization could be one of the key architecture feature for B5G/6G, in which, network service provisioning, run-time resource scheduling could be executed at much finer granularity providing extreme customization across all industries.

**Breaking barriers on edge computing**

5G business use cases impose more and more focus on local communications, i.e. factory networks (also called dedicated network or non-public network in 3GPP terminology), in which edge computing will play a crucial role. Edge solutions could help to explore network performance limits (especially the wireless part) and local data processing which could help to achieve the verticals' security and privacy requirements. However, high amount of relatively independent and isolated private networks cannot leverage the power of digital transformation platforms at a larger scale. Hence, how to interconnect information silos will expose new requirements for federated edge computing solution.

**Leverage the power of artificial intelligence**

Artificial intelligence (AI) continues receiving sustainable attention due to progresses in algorithm, platforms and chipsets. Its usage is being considered in many different industries. In 5G, the core network design intends to support relevant intelligence by introducing new types of network functions, but its usage has limited scope. For B5G/6G, it is expected that network architecture design and AI will go hand in hand. On one hand, AI will be utilized within the communication system to improve its operation and management efficiency (e.g. resource scheduling, interference mitigation, etc.); on the other hand, system architecture design should also provide better support to natively host AI services.

**Next generation of digital twin**

Digital twin is a digital or virtual replica of a physical entity which could be assets, processes, systems, etc. It was first invented and used in the manufacturing operation domain for system design, simulation, and risk management purposes. The digital twin concept itself also evolves over the time. Nowadays, this concept is IoT empowered, i.e. designed for connecting physical entities via wireless and sensing technology, and leverage the processing capability of Cloud. With the hyper connectivity promised by B5G and 6G, digital twins may further evolve and be natively adopted by communication systems, integrating verticals.

**Distributed ledger technology**

Blockchain received huge attention during past years due to its profound impact in the digital economy industry. This technology shows advantages in terms of handling transparency (immutability and auditability) among multiple business entities and could be further utilized in B5G/6G architectural aspects (e.g. ecosystem openness & collaboration, security) as well.