

Societal impact of 5G and 6G

September 8, 2022

Petri Ahokangas¹ Prof., Future digital business

Oulu Business School, Martti Ahtisaari Institute, University of Oulu, Finland 5G Suomessa nyt ja tulevaisuudessa

Contact: petri.ahokangas@oulu.fi



6G

FLAGSHIP

UNIVERSIT

Mobile communications of the future?



Future holographic communications and extending human capabilities with novel human-machine interaction with haptic and empathic communications to help access the metaverse

DATA * META

6G + AI PLATFORM Seamlessly functioning collaborative and independent machines such as robots, drones, or self-driving vehicles

Mission-critical functions of smart cities and industries that ensure privacy, security, and safety for everyone.

Using 6G to fight climate change or ensure environmental or societal sustainability

DTs are <u>technological</u> <u>solutions</u> protected by few patents, and in general the IP for one product is held by one single owner.

ETs are <u>inventions</u> or <u>innovations</u> that can be applied to drive radical change in the capabilities of a user or culture. They are characterized by rapid development of subsequent derivative technologies, often in diverse fields

GPTs are <u>technologies</u> or <u>infrastructures</u> that can affect an entire economy at global level and have the potential to drastically alter societies through their impact on preexisting economic and social structures



Transformation of businesses



AREA OF VALUE CO-CREATION

Yrjölä, S., Ahokangas, P. & Matinmikko-Blue, M. (2022). Value Creation and Capture from Technology Innovation in the 6G Era. IEEE Access, 10, 2022, 16299-16319.





How to approach the future?







< So what? >

Consequences for society



User-level impacts

- working processes that connect the physical, digital, and human worlds, enabling remote work to extend beyond the current digital-only work content.
- Extreme experience built on virtual, augmented, and extended reality will be possible anywhere; telepresence may become the norm instead of the pre-COVID-19 "in real life" approach.
- Distributed organization, learning, collaboration, and teamwork.
- Merged cyber-physical work contexts, mixed reality codesign and collaboration, experience before prototyping, and all kinds of immersive experiments, e.g., via haptic and affective/empathic communications.
- New human-machine interfaces, brain-computer interaction, embedded and wearable devices and intelligent surfaces.
- Autonomous AI-assistants, robots/cobots, and vehicles and drones and communities can be considered as new types of users.

Business-level impacts

- Ubiquitous, unlimited, and near-instant connectivity is available for things, machines, and robots applying circular and sharing economy principles in digital twins.
- Digital Trust, enabled by quantum computing and distributed ledger will provide businesses a secure and predictable basis for digital society with world-class cybersecurity, public safety, and fintech.
- Millions of private local small-scale operators will emerge in the future to serve the specific needs of industries, smart cities, communities (e.g., in the context of future smart grids) and different kind of campuses such as hospitals or universities.
- Complementors will utilize all kinds of platforms flexibly in parallel.
- The change from closed business models toward more open and mixed business models will continue, highlighting the role of coopetition, ecosystems-thinking instead of traditional supply- and demand-based platforms, and sharing economy strategies instead of traditional competition.

Yrjölä, S., Ahokangas, P., Matinmikko-Blue, M., Arslan, A., Golgeci, I., Tarba, S. (2021). Artificial Intelligence in the Telecommunication Sector: Exploratory Analysis of 6G's Potential for Organizational Agility. In Ratten, V. (Ed.) Entrepreneurial connectivity-Network, innovation and strategy perspectives. Springer.



Sustainability-level impacts

- The different sustainability perspectives should be considered in parallel as balanced and uncompromised by the developers and users of future technologies: environmental sustainability should not sacrifice economic and societal progress, societal values should not compromise economic and environmental sustainability, and economic sustainability should not cause negative societal or environmental consequences.
- Sharing economy principles will increasingly be applied.
- AI-enabled 6G will increasingly be used to monitor the natural environment.

Geopolitics-level impacts

- At the national level, concerns over sovereignty regarding digital technologies have already become an issue.
- Global competition of the US, China, and Europe in the AI and 6G contexts may lead to the creation of technology blocks that may negatively influence the scalability, replicability, and internationalization of the AI-based 6G services due to technological fragmentation, compartmented innovation ecosystems, techno-nationalism, and market protection.
- Regulation and harmonization decisions but also competition and innovation policies and especially the privacy, security, and consumer rights related decisions vary across blocks.

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Contact: petri.ahokangas@oulu.fi