Use case analysis (for discussion)

12,35 -12,55

1) According to the previous business case, let' s define:

- The general **need** addressed;
- The **sources of value** related to autonomous driving (why should people buy an autonomous vehicle? What are the impacts on their lives?)
- The **technologies** needed to turn that vision into reality;
- The **business actors** involved (the value chain / ecosystem)

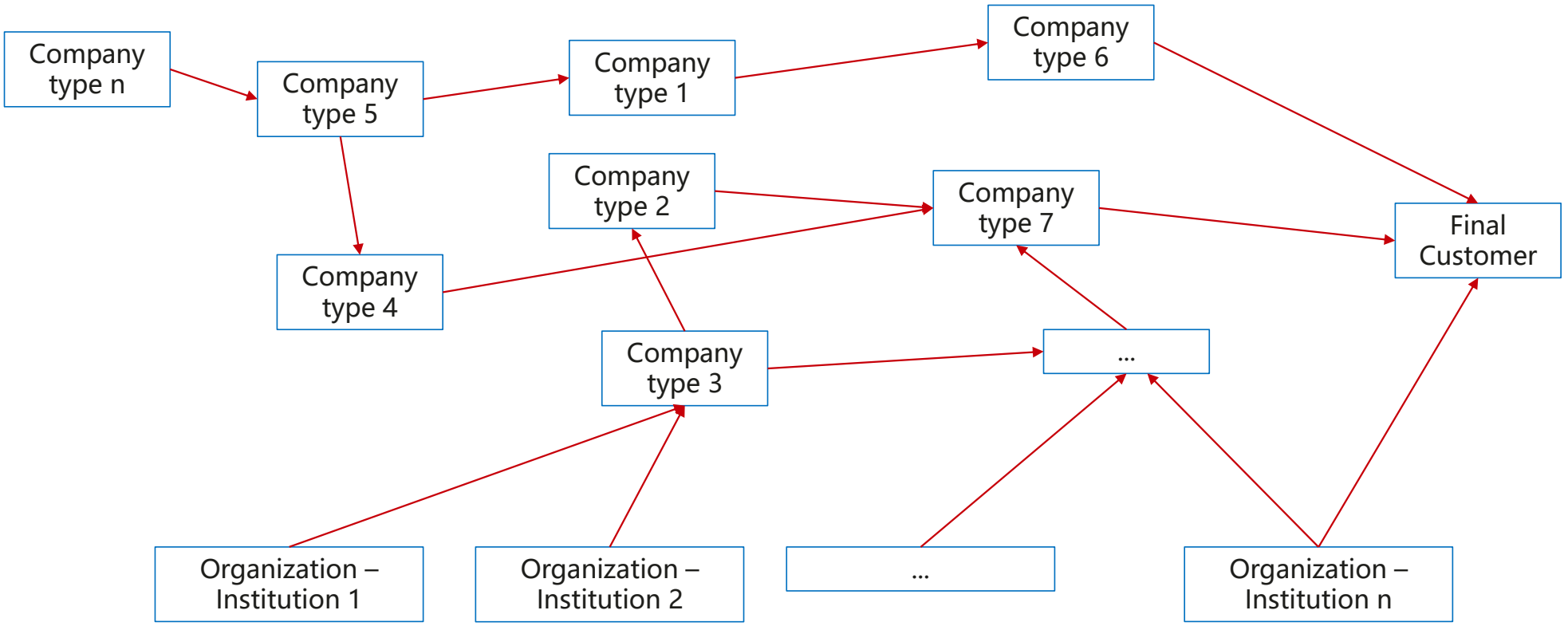
2) You are working in a company involved in the value chain / ecosystem you previously defined. Divide your group in two sub-groups:

- Group A: R&D
- Group B: Marketing and sales

Your mission is to develop a strategy to realize the *Smart transportation* use case by 2030. Please define and consider the following elements:

1. **Overall value proposition**
2. **Involved technologies**
3. **Strategic partners**
4. **Revenue sources**
5. **Costs**

Expectation – Exercise n. 1



Use case analysis (for discussion)

12,55 -13,15

1) According to the previous business case, let' s define:

- The general **need** addressed (2, 8)
- The **sources of value** related to autonomous driving (why should people buy an autonomous vehicle? What are the impacts on their lives?) (1, 10)
- The **technologies** needed to turn that vision into reality (5, 6, 3)
- The **business actors** involved (the value chain / ecosystem) (7, 9, 4)

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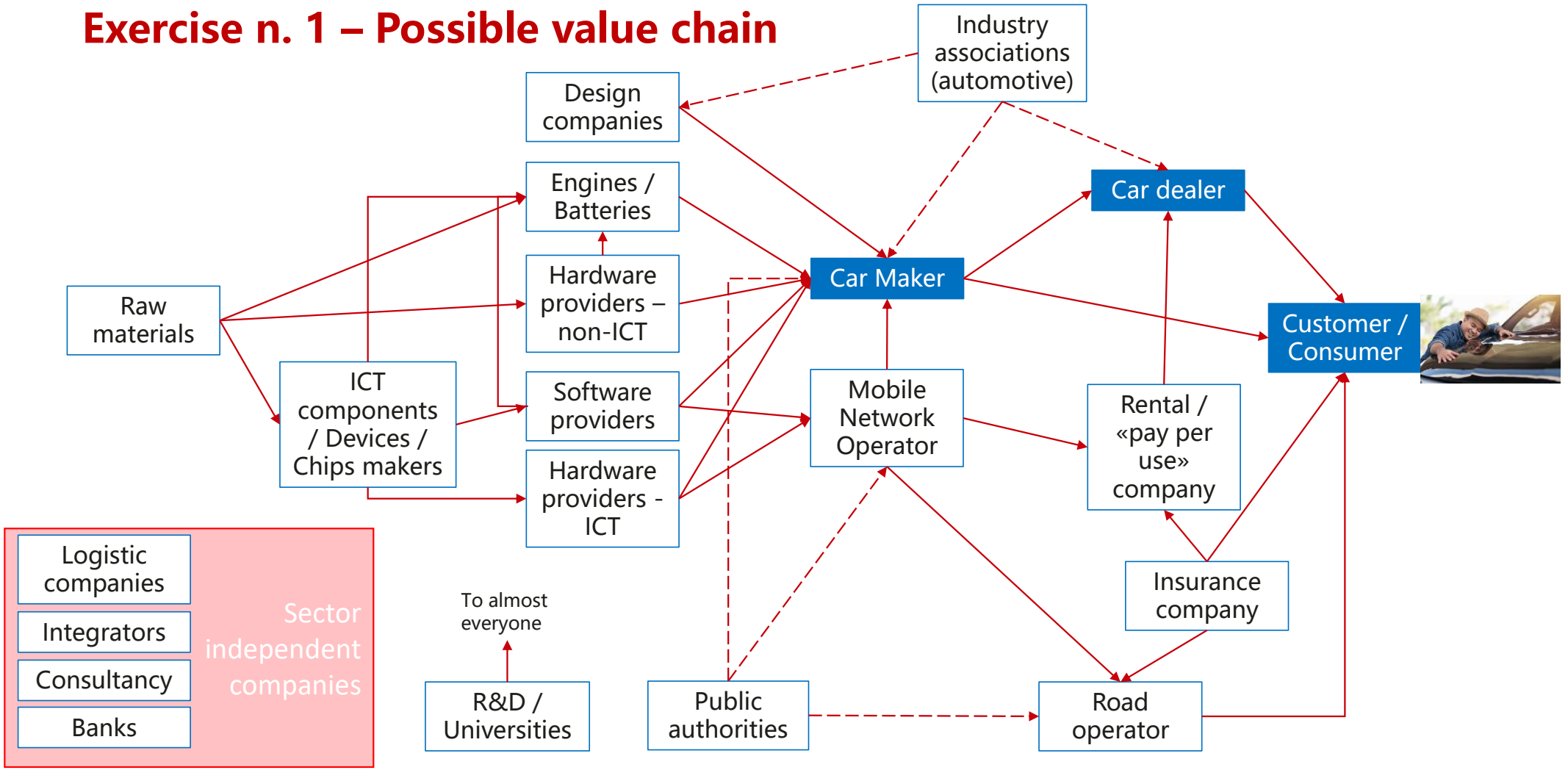
5. **Costs**

Exercise n. 1 – Technologies

- Hardware: chips, antenna, electronic components, power electronics, ICT devices, user interface (terminals, HUD, naked-eye 3D / new displays…)
- Software: (car) OS, embedded software, MCU, apps / onboard entertainment, CAN-bus (inside car), cloud/processing, development tools, simulation software, AR/XR tools
- Connectivity: V2X, IoT, Wireless technologies, network/IP data
- Autonomous driving: sensors (lidar, radar, camera), ADAS, software (image recognition / processing, AI)
- Energy and batteries, including new sources (e.g. hydrogen), storage, grid management
- Drivetrain (hardware and software)
- Mapping, tracking, localization/positioning technologies, including GNSS, WLAN, Cellular Networks, Short-Range communication, Ultra Wide Band, 5G/6G
- Safety and Cybersecurity technologies, both hardware and software

Exercise n. 1 – Possible value chain



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Use case analysis (for discussion)

13,15 -13,35

1) According to the previous business case, let' s define:

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1. **Overall value proposition**
2. **Involved technologies**
3. **Strategic partners**
4. **Revenue sources**
5. **Costs**
6. **Key activities**

Mobile Network Operator	ICT Provider - HW	ICT Provider - SW
7, 3	8, 6, 2	4, 1, 9, 5

Exercise 2 - Business model

Key partners

(companies, institutions,...)

Value proposition

(descritpion)

Key technologies

(list)

Key activities

(what to do and when to realize the value proposition)

Costs

(list)

Revenue sources

(list)

Takeaways

- The central **role of R&D** in ICT sector
- **5G (and beyond) technical requirements**: data rates, latency, connection density, frequency ranges/spectrum, technical and physical implications
- Business services and **scenarios** enabled by 5G
- 5G **market business cases**, technologies involved and their impact on value chains
- **B2C vs B2B** markets
- **Technology push vs demand pull**
- Mapping **value chains**/ecosystems
- Identify technologies and define **roadmaps**

Thank you.

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每个组织，构建万物互联的智能世界。

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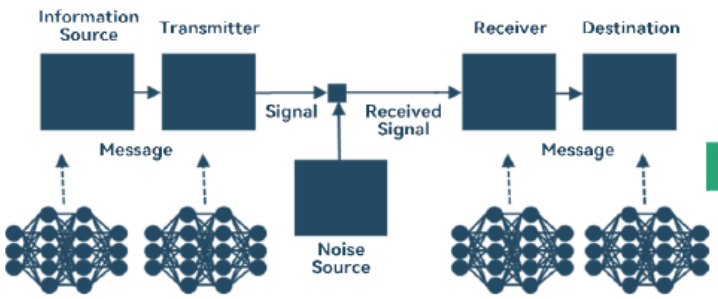
BACKUP

Key technology trends

- New spectrum up to THz and optical wireless communications for extremely high data rates
- Integrated sensing and communication (ISAC) for new services and enhanced wireless communications
  - Cellular as a sensor
  - Sensing-assisted communication
- AI as both a service and a feature in the 6G communication system to intelligently connect intelligent devices
  - AI for network
  - Network for AI
- 6G native trustworthiness based on a multi-lateral trust model and new cryptographic technologies
- Integrated terrestrial and non-terrestrial networks for full-earth ubiquitous access
- Green and sustainable networking for low total cost of ownership and sustainable development worldwide

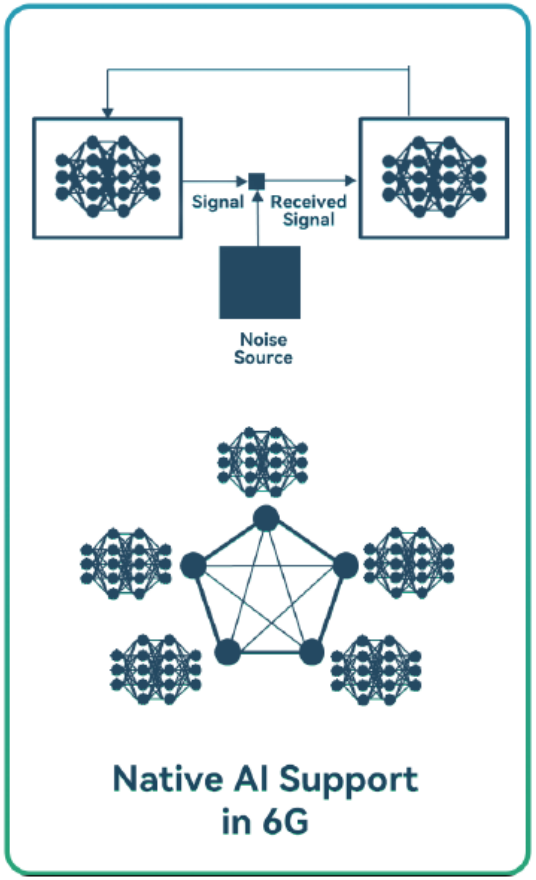
Pillar 1: Native AI

AI4NET



NET4AI

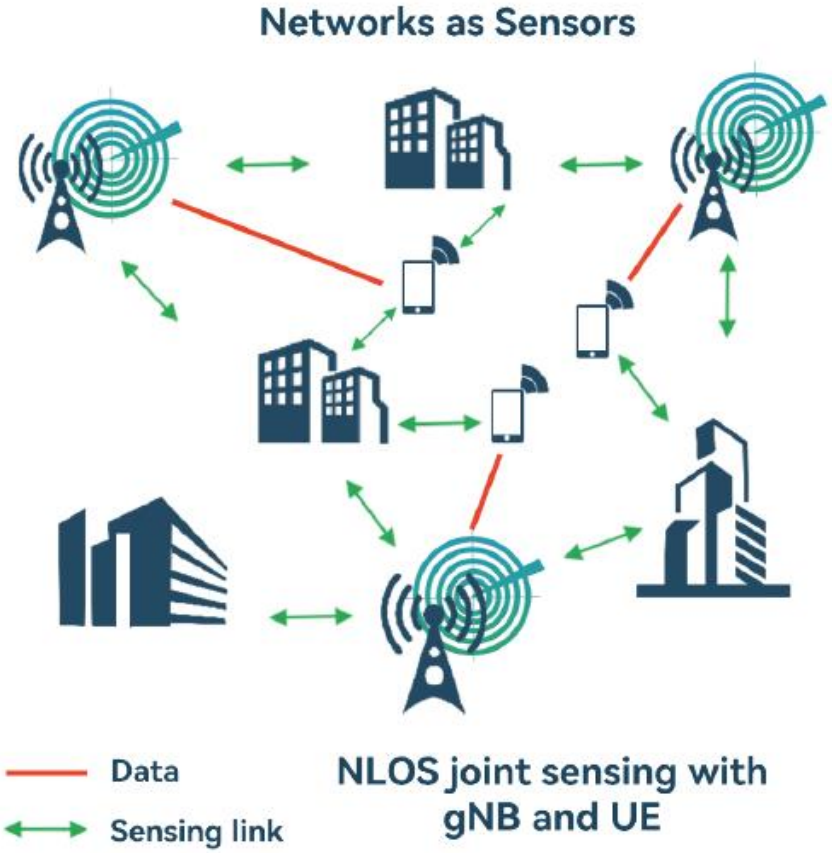
AI as an Optimization Tool



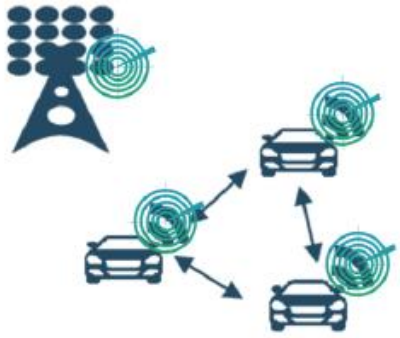
Link level:
From module-by-module optimization to intelligent E2E communication links

Network level:
From cloud-based computing to distributed learning network infrastructure

Pillar 2: Networked Sensing



Use Cases

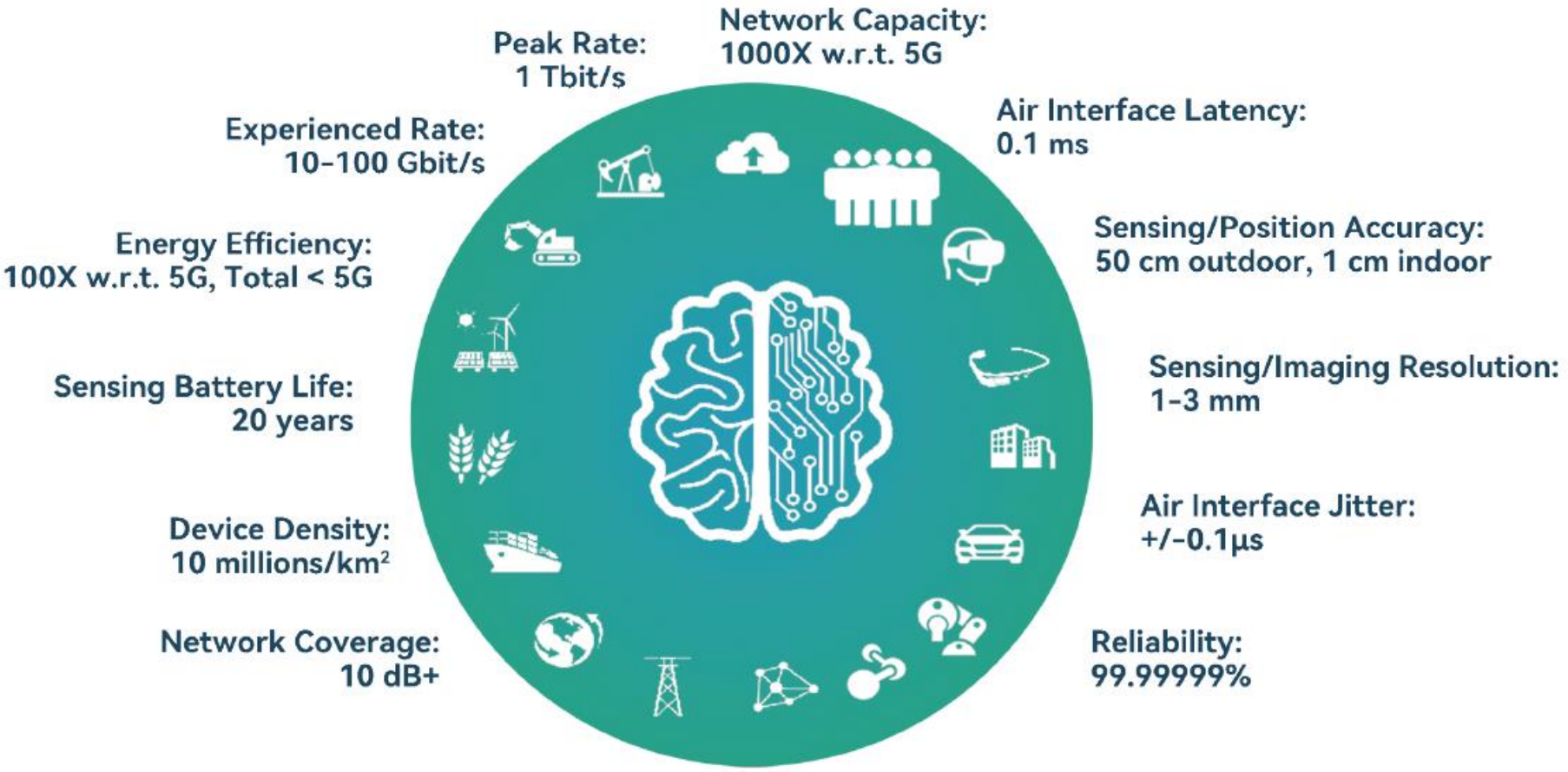

High-accuracy localization and tracking


Simultaneous imaging, mapping, and localization


Augmented human senses

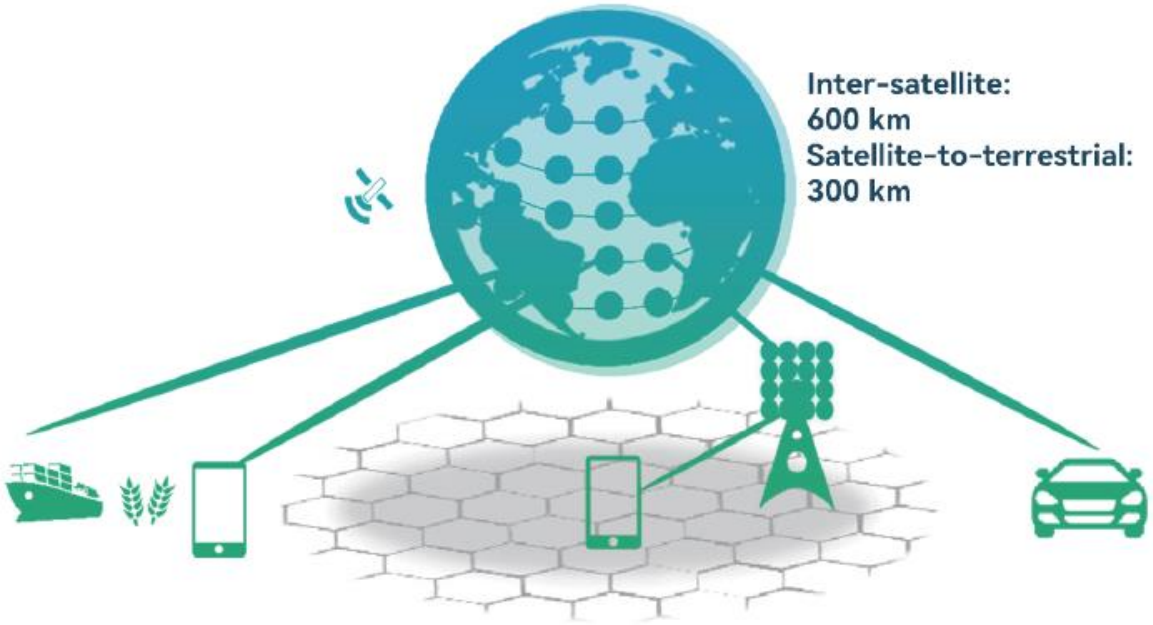

Gesture and activity recognition

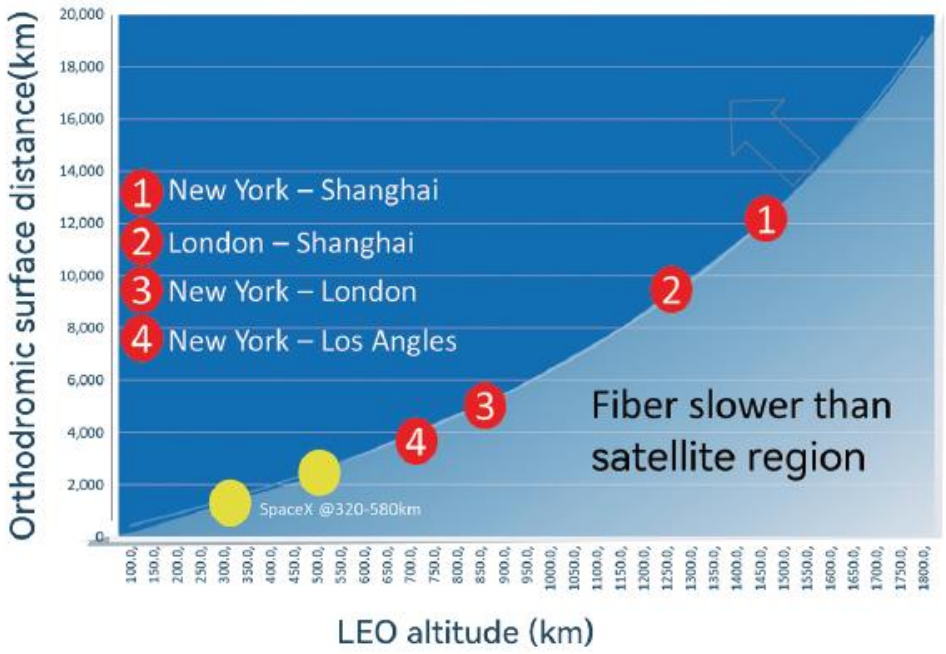
Pillar 3: Extreme connectivity



Pillar 4: Integrated NTN

BACKUP





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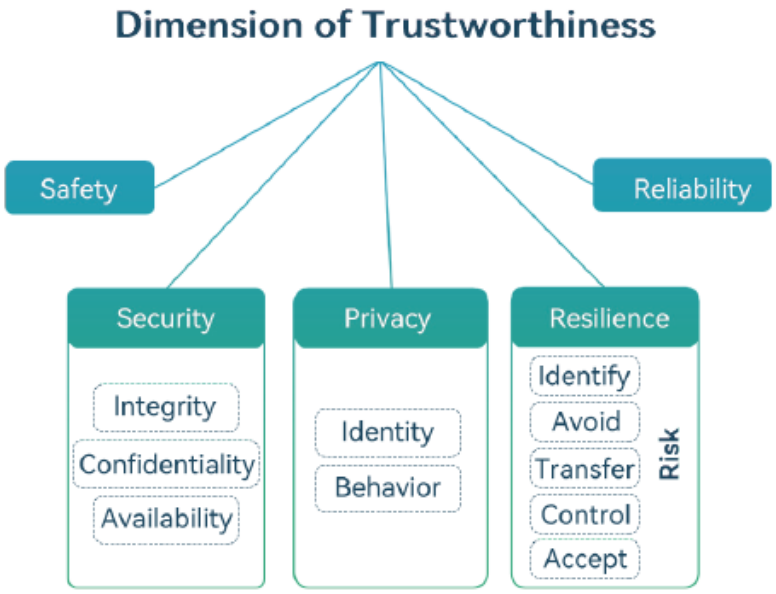
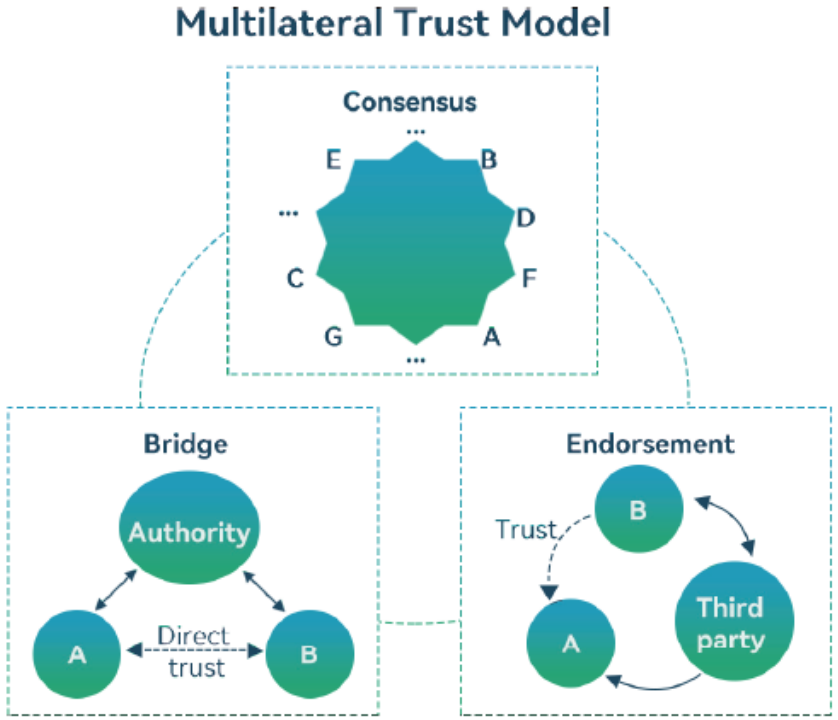
Pillar 5: Native Trustworthiness

BACKUP





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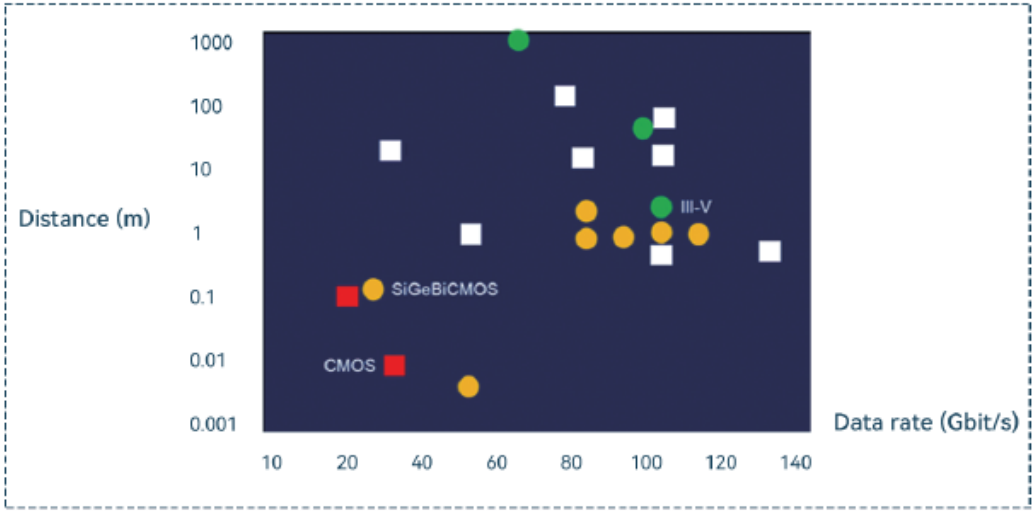
Pillar 6: Sustainability

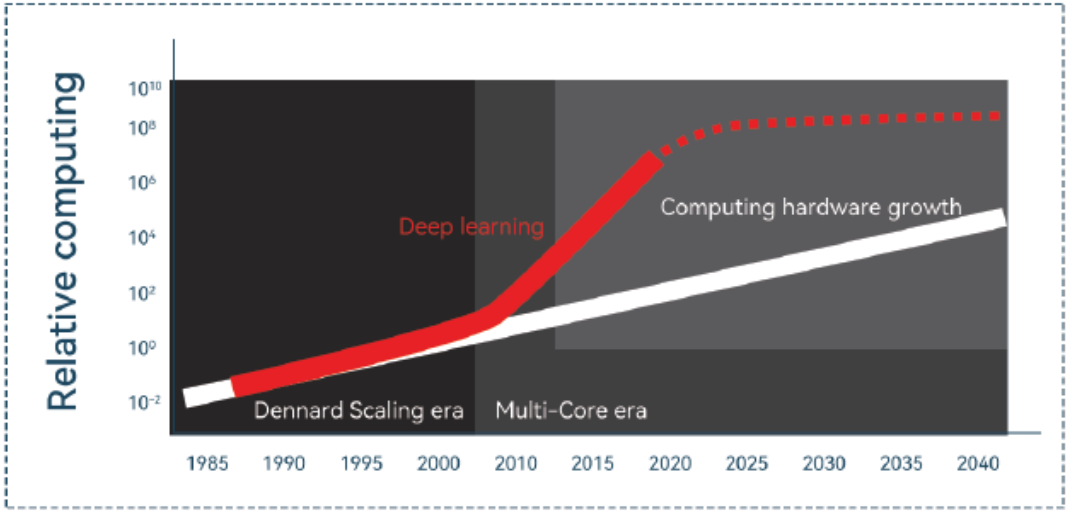
BACKUP

(a) Low Efficiency for mmWave RF Amplifier



Single digit efficiency of power amplifier to overcome additional 20dB propagation path loss

(b) Deep Learning Computing Requirement



Computing demand double every 2-3 months
Open source software have difficulty to sustain

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Reference: 6G Page on Huawei Website

Entrance	https://www.huawei.com/en/huaweitech/tags/6g
6G Vision	Envisioning and Defining 6G Together https://www.huawei.com/en/huaweitech/future-technologies/envisioning-and-defining-6g-together 6G: The Next Horizon https://www.huawei.com/en/huaweitech/future-technologies/6g-the-next-horizon Envisioning and Defining 6G Together https://www.huawei.com/en/huaweitech/future-technologies/envisioning-and-defining-6g-together
6G Prototypes	6G ISAC-THz Opens New Possibilities for Wireless Communication Systems https://www.huawei.com/en/huaweitech/future-technologies/6g-isac-thz 6G ISAC-OW Extends the Frontier of Spectrum for Wireless Communication Systems https://www.huawei.com/en/huaweitech/future-technologies/6g-isac-ow Ultra-Low Power and High-Data Rate Short-Range Wireless Enables Fully Immersive 6G https://www.huawei.com/en/huaweitech/future-technologies/6g-short-range-communications
6G Technology Journal Articles	Integrated Sensing and Communication (ISAC) — From Concept to Practice https://www.huawei.com/en/huaweitech/future-technologies/integrated-sensing-communication-concept-practice NET4AI: Supporting AI as a Service in 6G https://www.huawei.com/en/huaweitech/future-technologies/net4ai-supporting-ai-as-a-sevice-6g Terahertz Sensing and Communication Towards Future Intelligence Connected Networks https://www.huawei.com/en/huaweitech/future-technologies/terahertz-sensing-communication Very-Low-Earth-Orbit Satellite Networks for 6G https://www.huawei.com/en/huaweitech/future-technologies/very-low-earth-orbit-satellite-networks-6g 6G Native Trustworthiness https://www.huawei.com/en/huaweitech/future-technologies/6g-native-trustworthiness Fast Polar Codes for Terabits-Per-Second Throughput Communications https://www.huawei.com/cn/huaweitech/future-technologies/fast-polar-codes-tbps