5G Use Cases in the future MFF programme

Discussion on potential funding support mechanisms

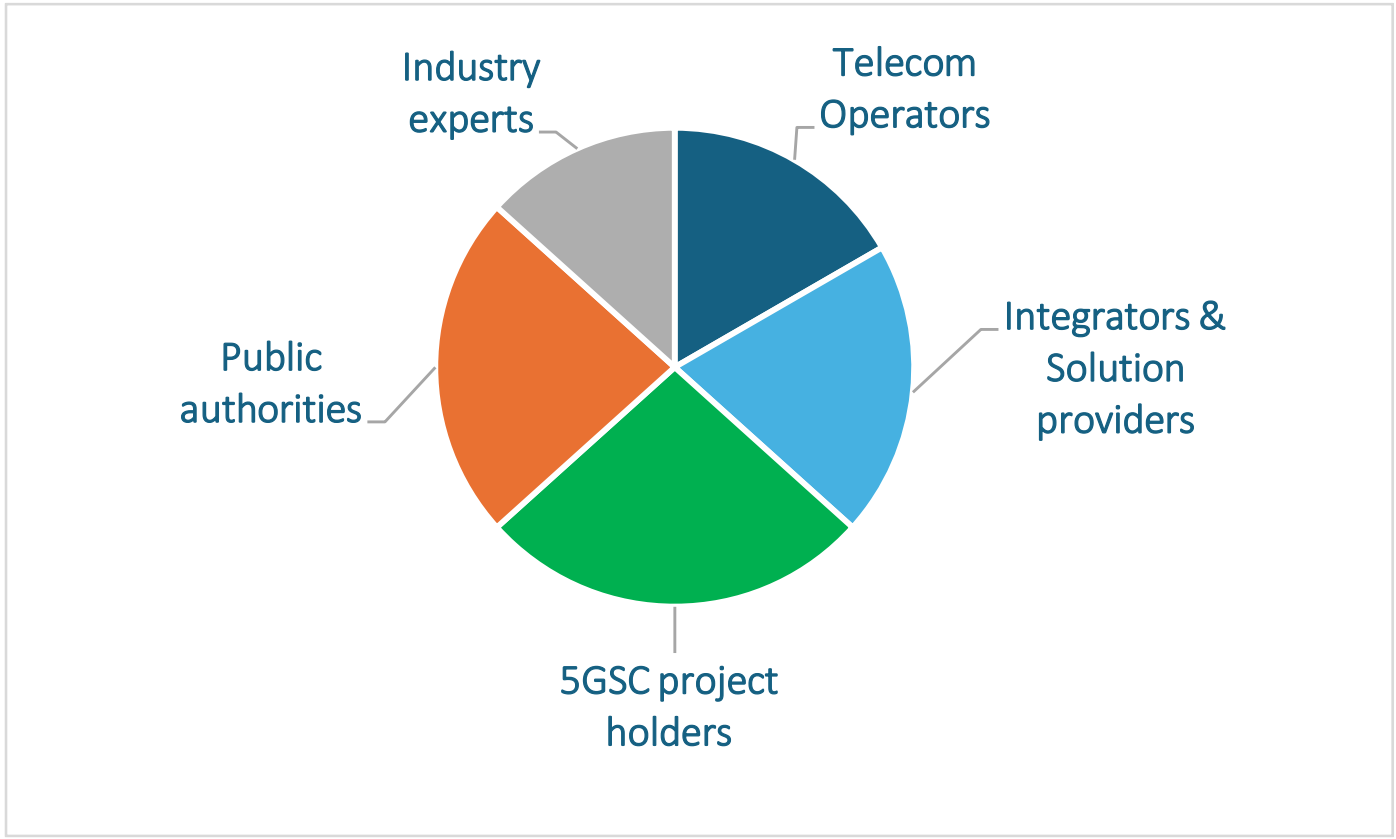
Study for *5G for Smart Communities*

Christophe Bodin – October 8th, 2025

CBO Consulting

With the support of SCHUMAN ASSOCIATES IDATE

Close to 30 interviews have been conducted in Q2 2025



Three major forces are stimulating demand in network infrastructures for 5G use cases

Development push from private 5G networks:

- The awareness level and the demand for private networks has **started to take-off** in Europe.
- Although volumes are still low and many networks are at an **experimental stage.**
- In Germany (most advanced market), **the trend is flattening**, and expected volumes were not reached.
- Telcos are now **preempting** some (large) cases.

MNOs' gradual shift towards 5G SA:

- The **high cost** for upgrading the network has for now prevented a rapid move towards 5GSA.
- Until now, 5G has been used for increasing throughput (NSA) but **not really for innovation.**
- MNOs have developed a **large range of offering** (Wi-Fi, 4G, 5G NSA, 5G SA,..) and propose a hybrid mode.
- 2024-25 **marks the start for SA** in many MS.

Introduction of 5G neutral networks:

- **Early-stage initiatives** have been developed in Rome (Smart Cities), Portugal and Slovenia (Smart Territories)
- Although, the trend is limited and is facing obstacles. MNOs are **reluctant to neutral networks run by 3rd parties**.

5G use case market development is still at its infancy, due to typical ‘early-stage’ barriers

A low level of demand:

- Market awareness as been **limited to large corporations** that could leverage expertise and innovation management
- The **low involvement of MNOs** as hindered market uptake. New entrants have not always managed to convince.
- In some cases, prospects have faced **budget constraints** that have delayed decisions**.**

Fragile operational demonstrations:

- Lack of available platforms, due to **delays in software releases** have jeopardized some demonstrations.
- **Legacy technologies** (LTE, Wi-Fi and LoRA) are resisting, considered as ‘good enough for now’
- 5G SA devices are often **unavailable or expensive** compared to “off-the-shelf” products of legacy technologies.

Uncertainties on the future regulation framework

- **Spectrum availability and affordable prices** are critical for unlocking demand: It is not full defined nor harmonized.
- Development of private networks and shared networks / neutral hosting require **guidance on markets & competition**.
- Development and promotion of **5G open platforms** could stimulate competition and increase ‘value for money’.

At mid-2025, some positive market drivers have emerged

The market has gained awareness:

- There is a **significant involvement of industrial companies**.
- It is **gradually increasing** in SMEs and public bodies**.**

5G expertise has spread across the market:

- **Numerous pilots** developed across the EU (42 through 5GSC but also through national programmes)
- A degree of **'proof of value'** has been sometimes established (e.g. productivity gains of ar. 15%).

Private networks with 'network as a service' pricing have introduced affordable solutions:

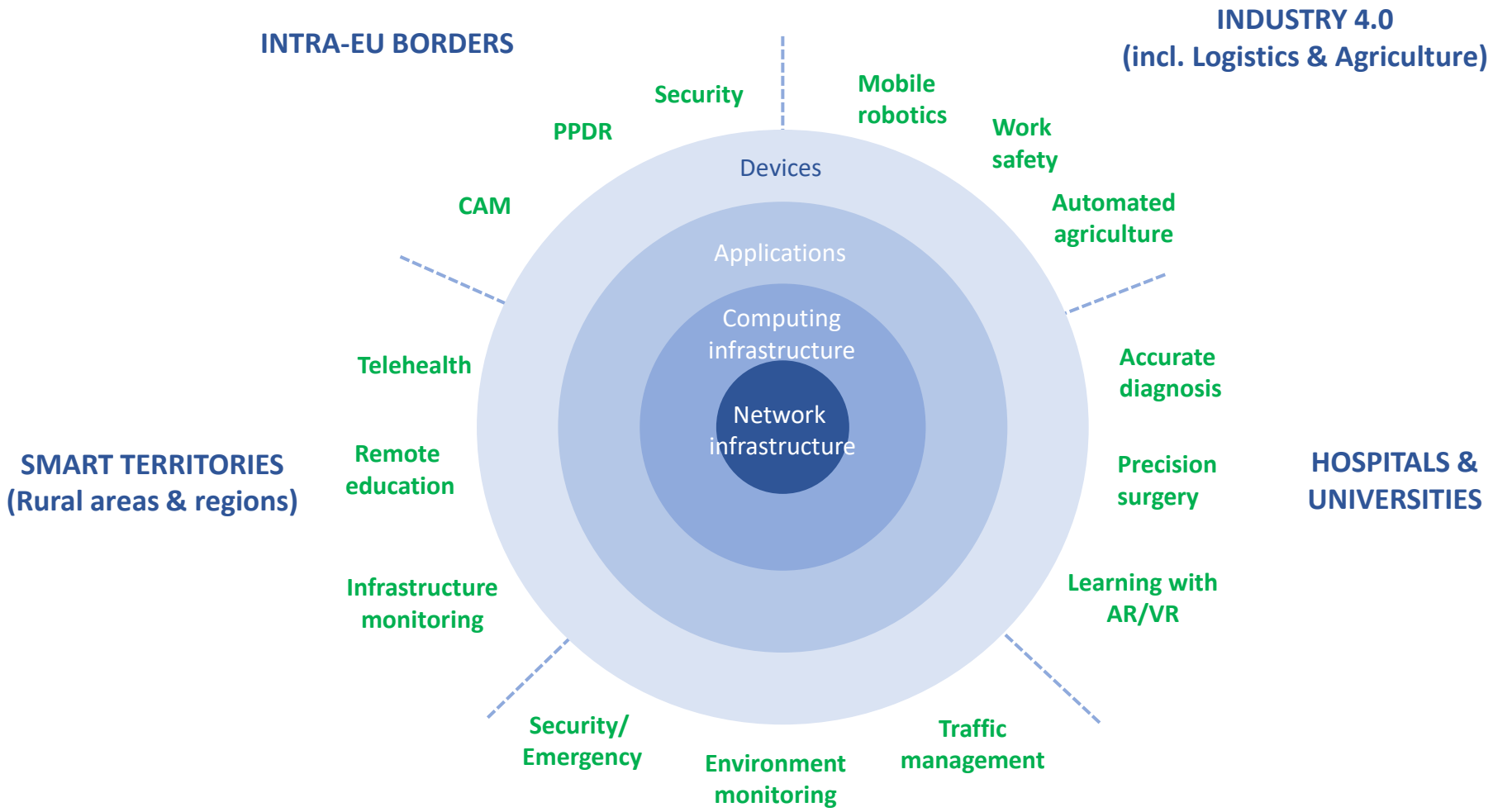
- Total Cost of Ownership (CAPEX + OPEX) starts at **€ 50k over 3 years**.
- Average investment in a 5G network is **around € 300k**.

New drivers will contribute to creating positive market momentum:

- **MNO's recent entry** will boost market awareness.
- Clarifications regarding **5G spectrum regulation** could be a reassurance factor.

As a sign, the latest 5G SC CEF call (Feb. 2025) received a **250% oversubscription**

The infrastructure is the core … but only applications & devices demonstrate the value



Source: CBO Consulting

Industry 4.0 (including Logistics and Agriculture)

5G as a support to more competitive and resilient European industries and agriculture

Market Status

Drivers

- A better understanding & knowledge about 5G but **development is very slow**. Hype is now on AI.
- Killer apps are **mission critical, in-door/out-door applications and flexible mobile robotics** (incl. drones). For the rest, for now, Wi-Fi is enough.
- Current industrial use cases have demonstrated **productivity gains of 15% and RoI under 2 years**.

Barriers

- Still **a very low level of awareness** (notably industrial SMEs) on 5G value potential
- Many companies (except the ones with IT teams) have **a low level of technological expertise**.
- 5G proof-of-value is still not clear (to be fine-tuned).
- SA devices are **unavailable or costly** (vs Wi-Fi/LoRa)
- **Spectrum uncertainty** is an obstacle to investment.

Recommendations

EU policy

- The topic should be **"Industry digitisation"** and globally address 5G & 6G + Edge + AI + Cybersecurity.
- Disclosing **6G could delay & impede 5G adoption**. 5G should be presented as a starting point for 6G.
- There is an urgent need for **a large wake-up call to SMEs** on a fast and large "industry digitisation".
- Spectrum policy should be **clearly defined and harmonized** across the EU.

Universities & Hospitals

5G as a support to more efficient and quality-driven healthcare and education in the EU

Market Status

Drivers

- For healthcare, **a strong trend in the US** with dozens of pilots. In the EU, a growing interest but coming from medical doctors, not from the administration.
- **Efficiency improvement** has been demonstrated in US which strongly drives adoption there.
- **Cybersecurity** is a strong driver for EU hospitals.
- Universities have often **available 5G frequency bands** (for research purpose) or partner with MNOs.

Barriers

- Demand is still emerging and the awareness on 5G value potential is limited to **"use case innovators".**
- Hospitals (and Universities) **lack the necessary technological expertise** to implement and run 5G.
- The proof-of-value is still questioned by stakeholders
- 5GSA devices are **unavailable or costly** (vs Wi-Fi)
- Limited budget availability and spectrum uncertainty are **obstacles to investment**.

Recommendations

EU policy

- The topic should be approached at National & EU level with plans on **"Hospitals / Education of the future".**
- There is a need for a large EU sharing on **best practices** in healthcare (and possibly in education).
- **EU start-ups** providing healthcare applications & devices (robots, AR/VR,…) should be better supported.

Smart Cities

5G as a support to more livable, sustainable and efficient European cities

Market Status

Drivers

- Still very experimental at this stage. Even in the most advanced smart city cases, **no full-scale model**.
- Major app for now is **infrastructure** (gas, power, water, waste,…) **and environment monitoring (IoT)**.
- Killer app expectations are on Urban Mobility (**traffic management and autonomous transportation).**
- MNOs are **well placed** for the implementation through slicing but deployments have been delayed.
- **Neutral hosting** is an opportunity for accelerating.

Barriers

- Despite interest from municipalities, decision-making processes are **political and can face rejection** of 5G.
- Governance is run with multiple stakeholders which make it **more complex in practice**.
- Municipalities **lack the necessary technological expertise** to implement and run 5G.
- Urban mobility is still at **a very experimental stage**.
- Besides the Boldyn Roma case, there are **no clear neutral hosting/network sharing models** in place.

Recommendations

EU policy

- The topic should be best approached through **“Urban Mobility”** where 5G can be fully disruptive.
- There is a need for a large sharing of Smart Cities **best practices**, including neutral hosting/network sharing.
- **EU start-ups** with smart city applications & devices (autonomous vehicles, AR/VR,…) should be better supported.

Smart Territories (Rural Areas & Regions)

5G as a support to more attractive, cohesive and efficient European rural areas

Market Status

Drivers

- Because of densification, MNOs **will have to invest heavily in rural areas** but without real demand.
- For economic reasons, they would have **an interest in mutualising networks** to reduce deployment cost.
- Some initiatives (Portugal, Slovenia, France, Spain,…) have emerged of Private network or Neutral Hosting.
- Demand is limited but **5G networks could be a trigger** for the development of Smart Agri/Forestry, e-health and infra/environment monitoring**.**

Barriers

- MNOs are **reluctant from neutral hosting**, as they are run by third parties. They prefer network sharing.
- Regions and Governments are **not aware of the issue** and are not pushing yet towards mutualization.
- For private networks, a key issue is **in the acceptance of MNOs to interconnect** to avoid any local isolation.
- Funding **will be required** to help an acceleration in the 5G coverage of rural/remote areas.
- As for now, **no clear investment model** has emerged

Recommendations

EU policy

- The topic could be approached under **"Rural 5G mutualized capabilities"** where 5G connectivity is central.
- There is a need for **building awareness** and a large sharing of **innovative cases** for smart territories in the EU.
- A good 5G coverage in rural areas would be **an opportunity to leverage EU start-ups** (smart agri, e-health…).

Intra-EU borders

5G as a support to a seamless Europe and to more secure borders

Market Status

Drivers

- Some 5G use cases **should not be stopped at a land border**: Defense/PPDR, Corridors and Autonomous driving, Maritime telecommunication (future 6G), …
- There are **no initiatives for now**, except for corridors (25 projects funded and investment models tested).
- An interest could come first regarding **Security and Defense (EU borders management)**, but there could an opportunity later for local industries and agriculture & forestry.

Barriers

- **Coordination** between Member States on radio spectrum regarding cross-border topics is requested.
- In these fields, stakeholders are typically national administrative bodies **having authority on their own territory**, even if coordination at EU level exists.
- Projects could involve many stakeholders and may **require 3rd parties** to operate the whole use case.
- Some **high-level political coordination** at European level may be required to monitor these projects

Recommendations

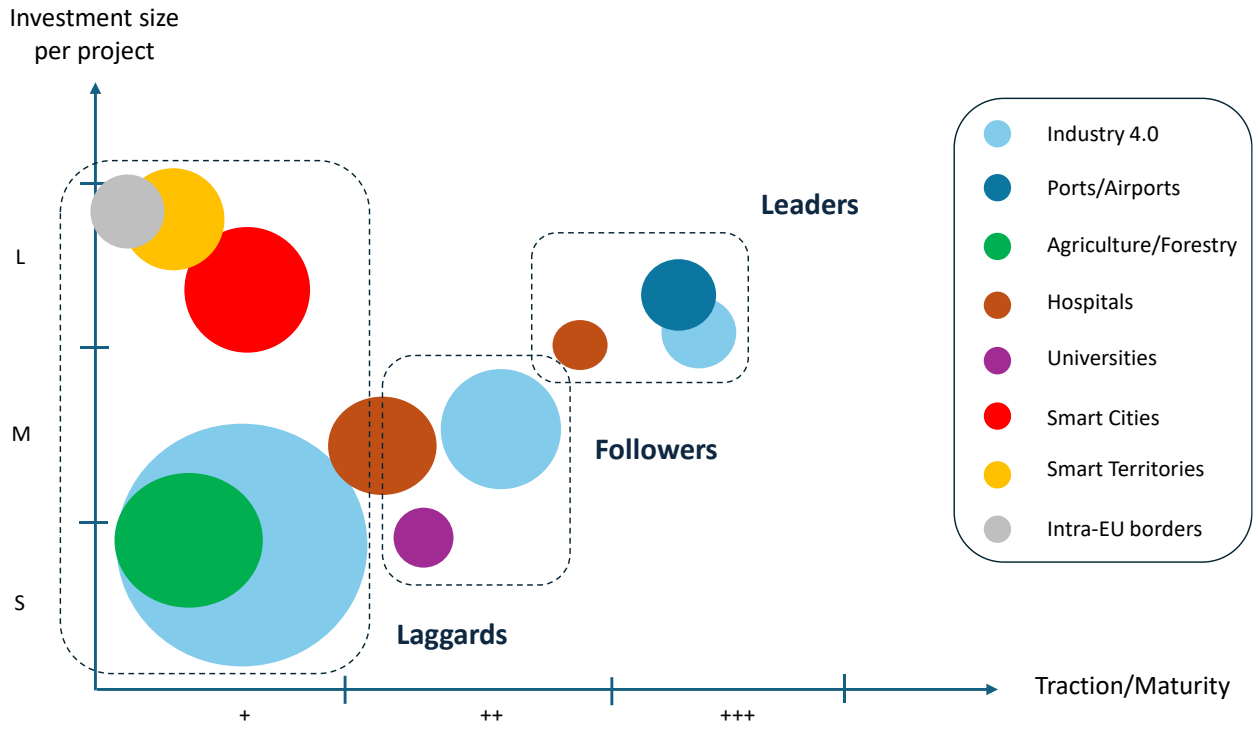
EU policy

- The topic could be approached under **"5G seamless Europe"** where 5G across borders would be central.
- There is a need for **building awareness** and developing opportunities of project collaboration/coordination.
- It would make sense to **leverage available results from 5G corridors pilots** for other use cases, set on larger areas.
- It would also require **coordination at EU level** amongst regulators and amongst use case stakeholders.

Regarding network & edge infrastructures, the EU investment need could be significant

	Industry 4.0 (incl. logistics & agriculture)			Universities / Public Research Institutes & Hospitals		Smart Cities	Smart Territories	Intra-EU borders	
	Manufacturing & Logistics	Agriculture & Forestry	Ports/Airports	Hospitals / Clinics	Universities / Public Research	Smart Cities	Smart Territories	Mission-critical & security	Transport corridors
Potential EU cases	~2m (SMEs except micros)	~3m (more than 5 ha)	~300 (ports) ~300 (airports)	~10,000 (large hospitals)	~500 (universities)	~800 (50,000+ inh.)	n.a.	n.a.	>25

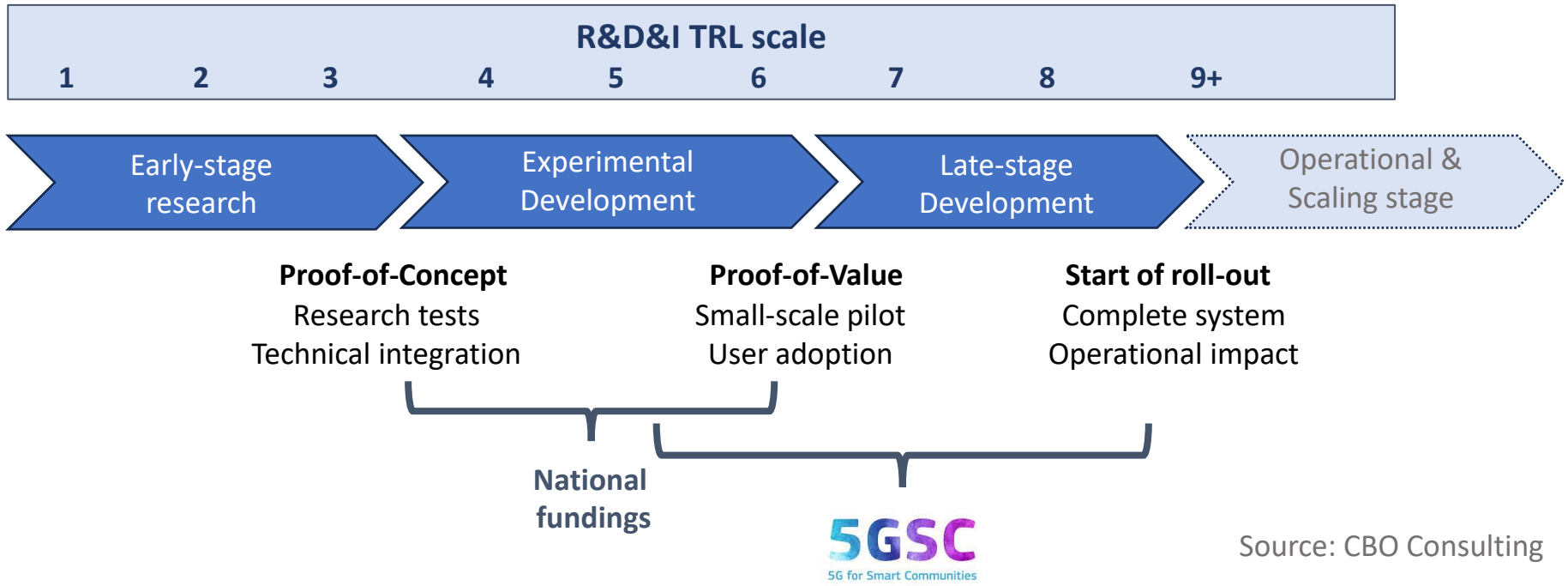
Source: CBO Consulting



Source: CBO Consulting

- Besides large cases, the average investment for 3C infrastructure could range from **around 50,000 to a few million Euros**
- In total, we could evaluate the investment need at EU level to be in the magnitude of **hundreds of billion of Euros**.

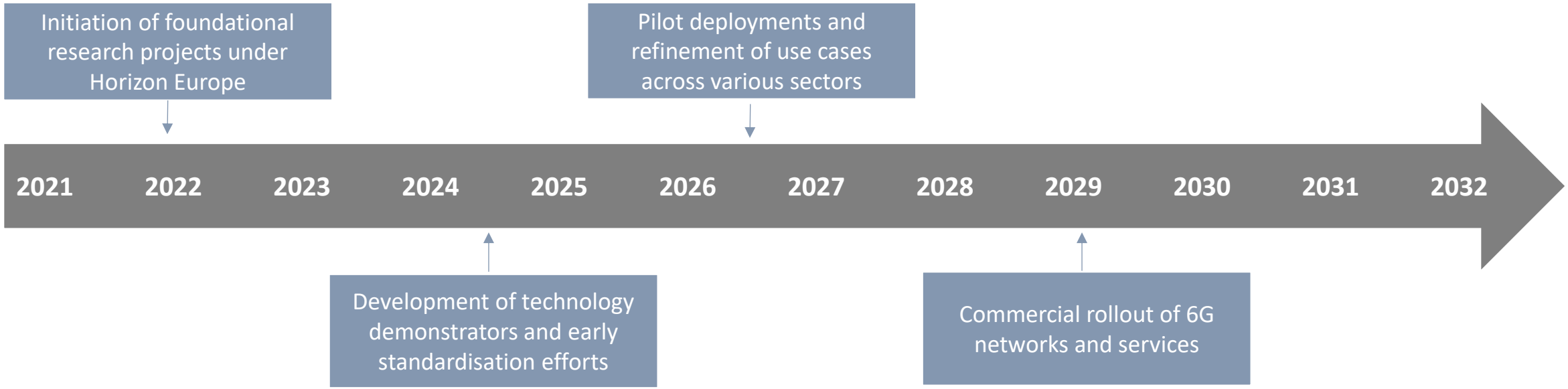
For now, the implementation of 5G SA use cases is mostly at a TRL 6-7 stage, not more



Source: CBO Consulting

- While the 3C infrastructure can be considered at TRL 8-9 stage, the limited number of fully-fledge scalable applications and the lack and high price of 5GSA consumer/industrial-grade devices makes **current 5G SA use case development at a TRL 6-7 stage**.
- In the last years, most national funding programmes have focused on **TRL 4-6 ("Experimental Development")** under GBER section 8.
- Horizon Europe has also supported the testing of 5G use cases (vertical industries, smart cities, …), usually under TRL 6 stage.

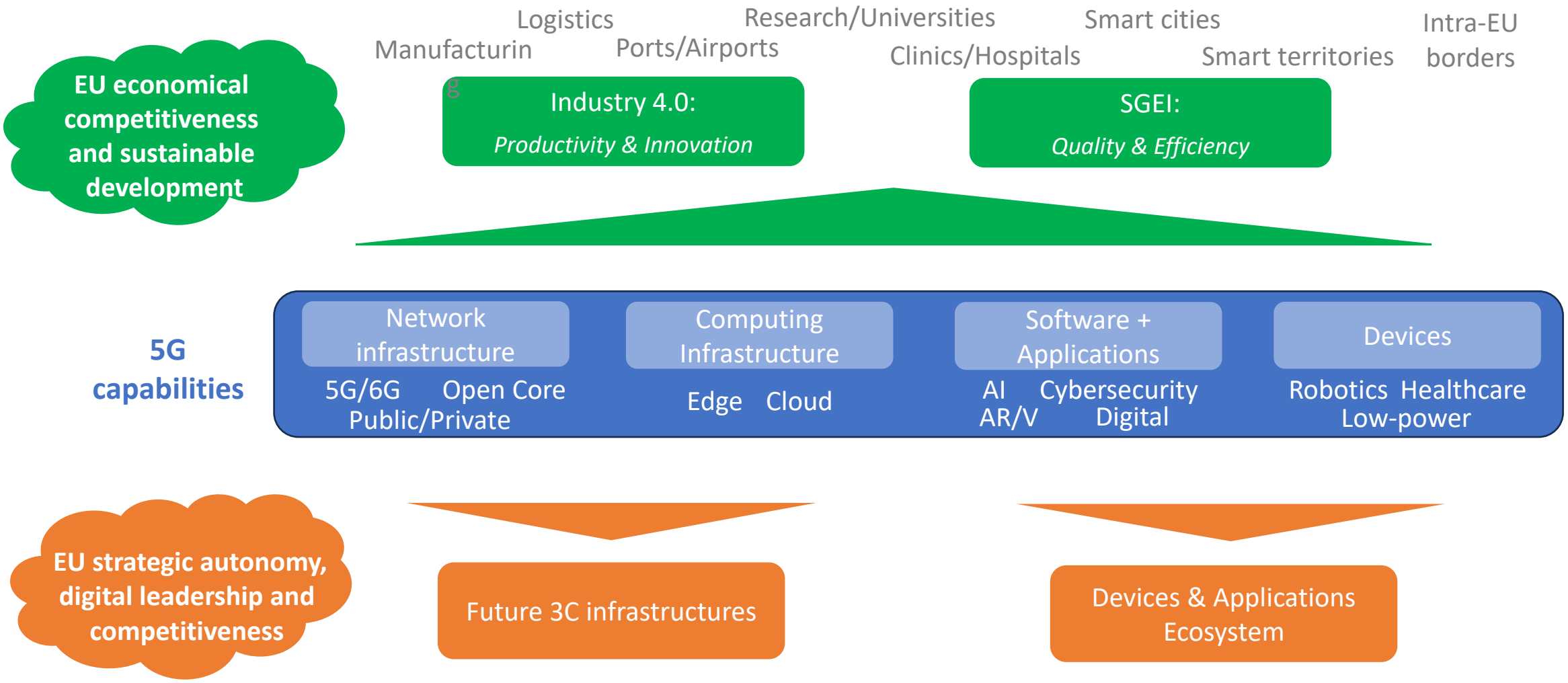
Beyond 5G, 6G is around the corner and should now be anticipated for 2030



Source: IDATE

- 6G is considered in **continuity with 5G** ('5G and beyond') as the technology disruption is more between 4G and 5G
- We could expect **more powerful features** and **strategic impacts** notably for enterprises
- A slower 5G adoption would **result in investment delays in 6G** and would then slow down 6G adoption
- 6GSNS is supporting 5G development (towards 6G) but focusing on technological development (test beds at small & large scale)

The development of 5G capabilities could have a double-side critical impact for the EU



Source: CBO Consulting

Building up a “5G and beyond” EU ecosystem under the ECF umbrella in the next MFF

EUROPE'S BUDGET THE POWER OF TOGETHER

Objectives / Thematic pillars

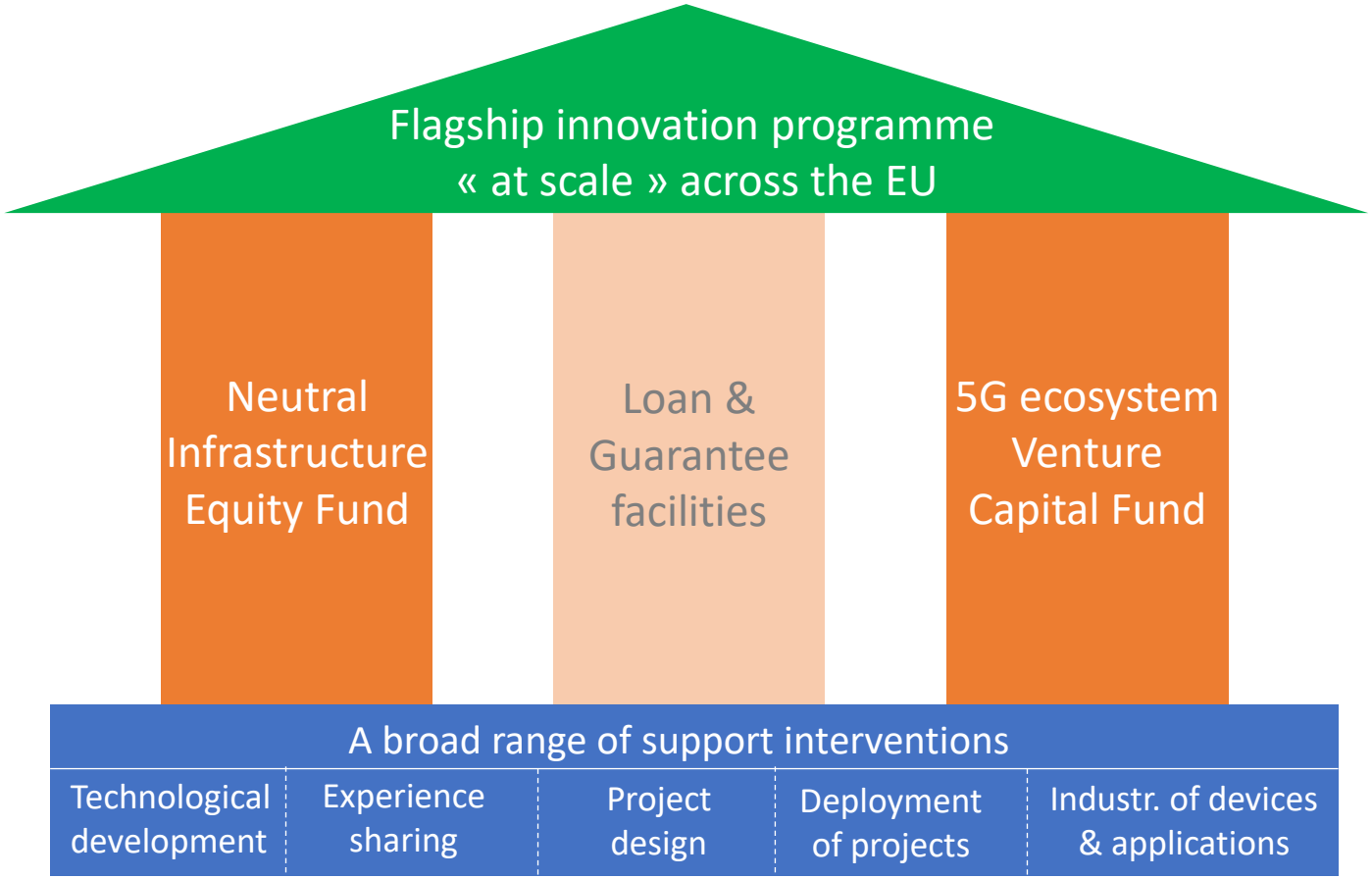
To setup and develop **large 5G sectorial blueprints** to serve as references at EU level

To foster the development of **key strategic capabilities:** neutral infrastructures + 5G ecosystem

To trigger **the proliferation of 5G projects,** devices and applications across the EU

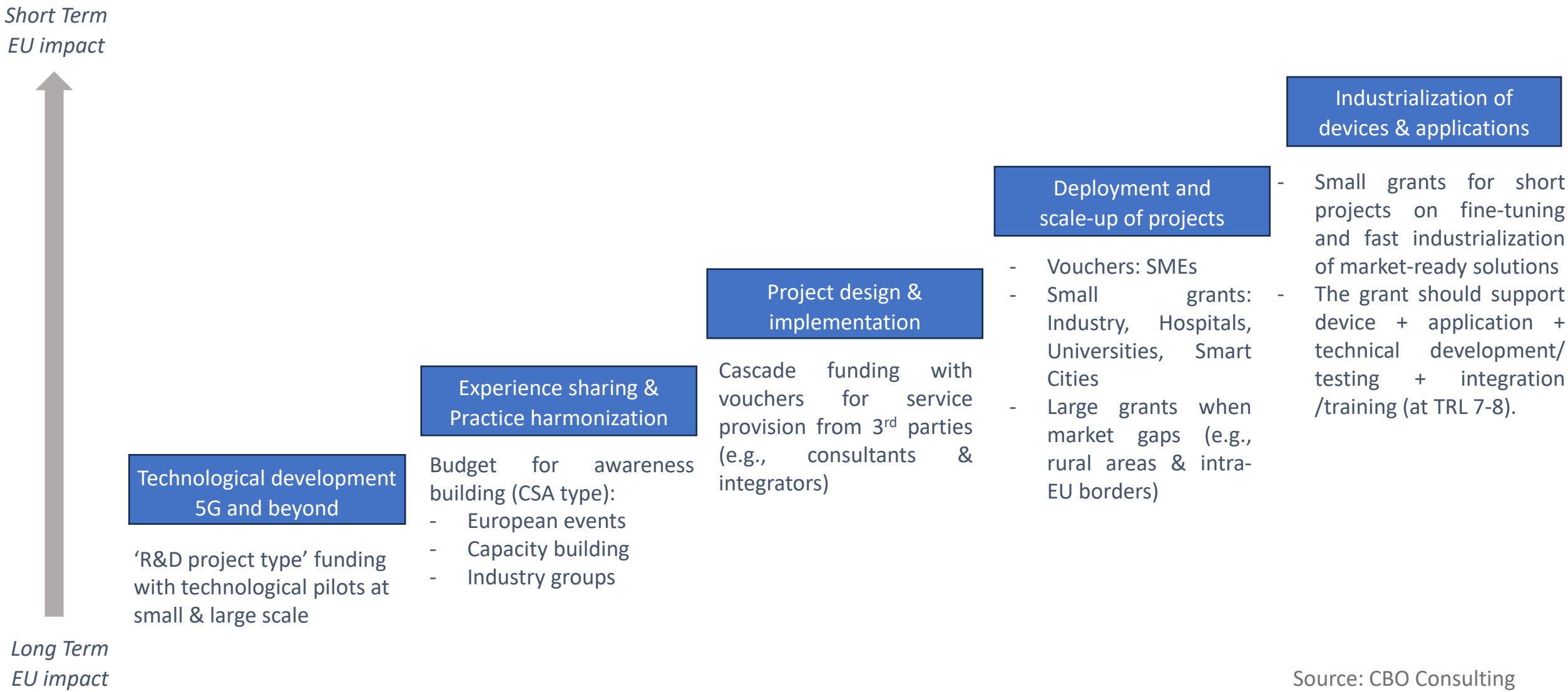
EU Budget under the European Competitiveness Fund

“5G as a key enabler for EU industrial & societal transformation”



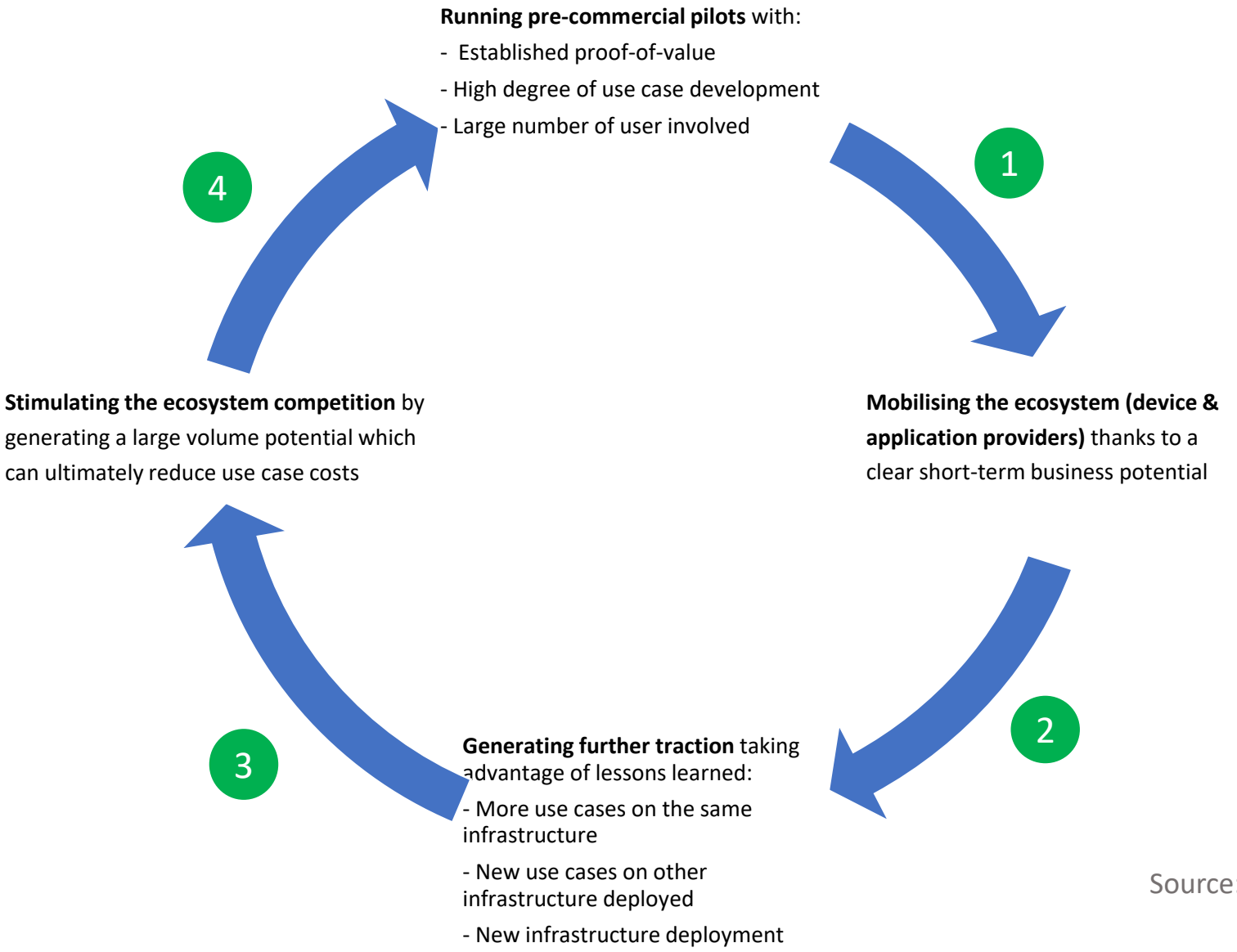
Source: CBO Consulting

A set of interventions could trigger project multiplication and expansion



Source: CBO Consulting

A flagship programme should target large pre-commercial use cases (TRL7-8)



Source: CBO Consulting

An EU innovation programme could scale and develop 5G use case synergies

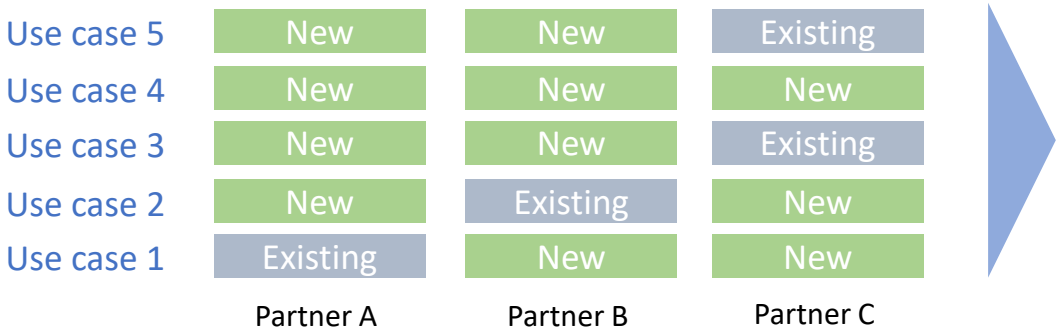
Programme profile:

- At least 3 partners in 3 member states
- A minimum of 5 common use cases
- A large number of users (with a threshold to be defined per use case)
- Topics: Manufacturing & Logistics, Agriculture, Ports, Airports, Hospitals, Universities, Smart Cities, Smart Territories, Borders (Corridors are excluded)
- With clear complementarity/synergy (either same approach and/or in continuity)
- Involving at least 2 EU SMEs as providers for use cases (device, software, …)

Project design:

Potential grant: 10-20 m Euros (infrastructure + devices + software + implementation)
Maximum duration: 2 years

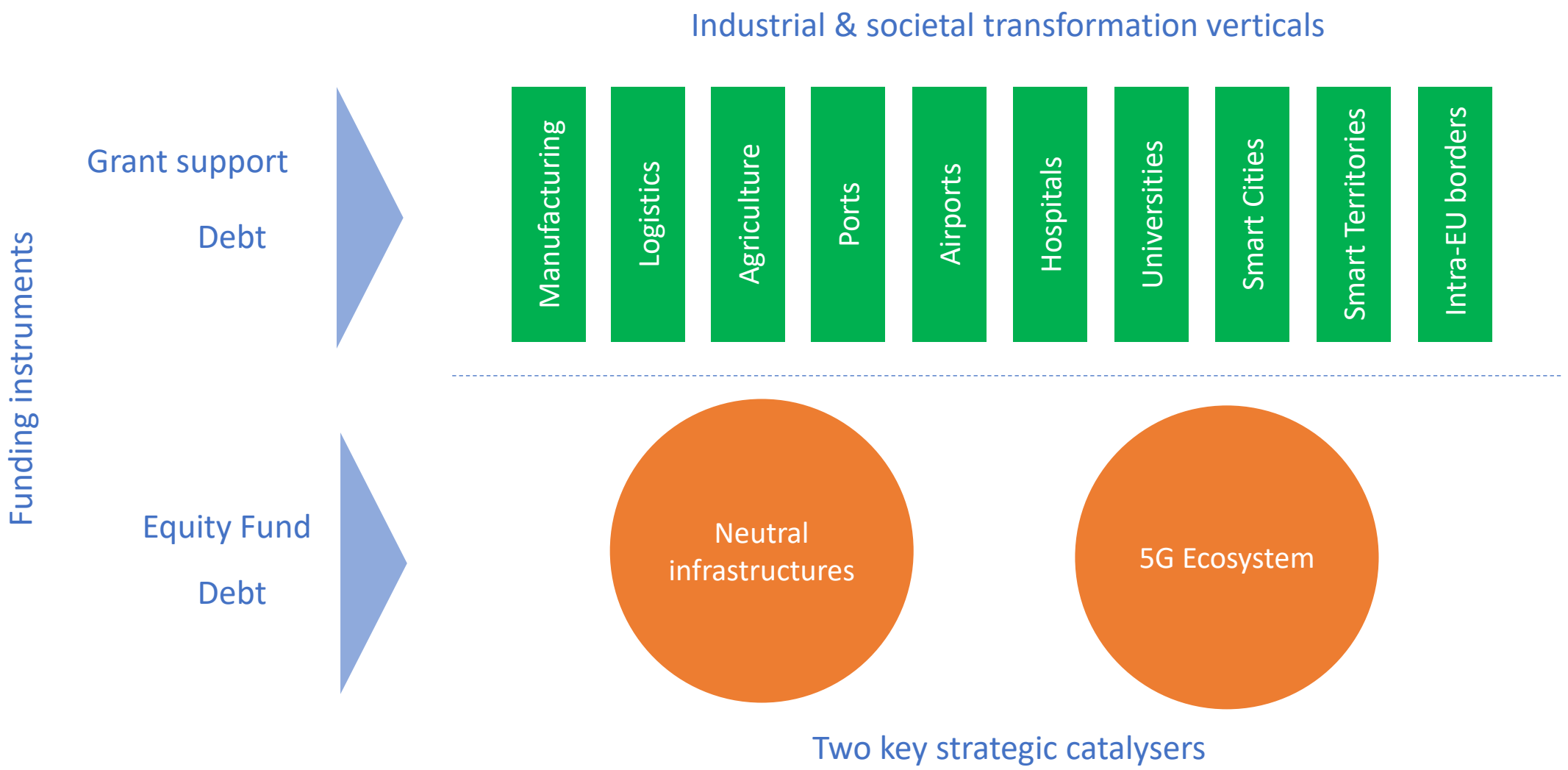
Target: Partners with infrastructures in place & a few use cases tested at small scale



Scaled with the support of 'use case partners' (devices + software + integration + training)

Source: CBO Consulting

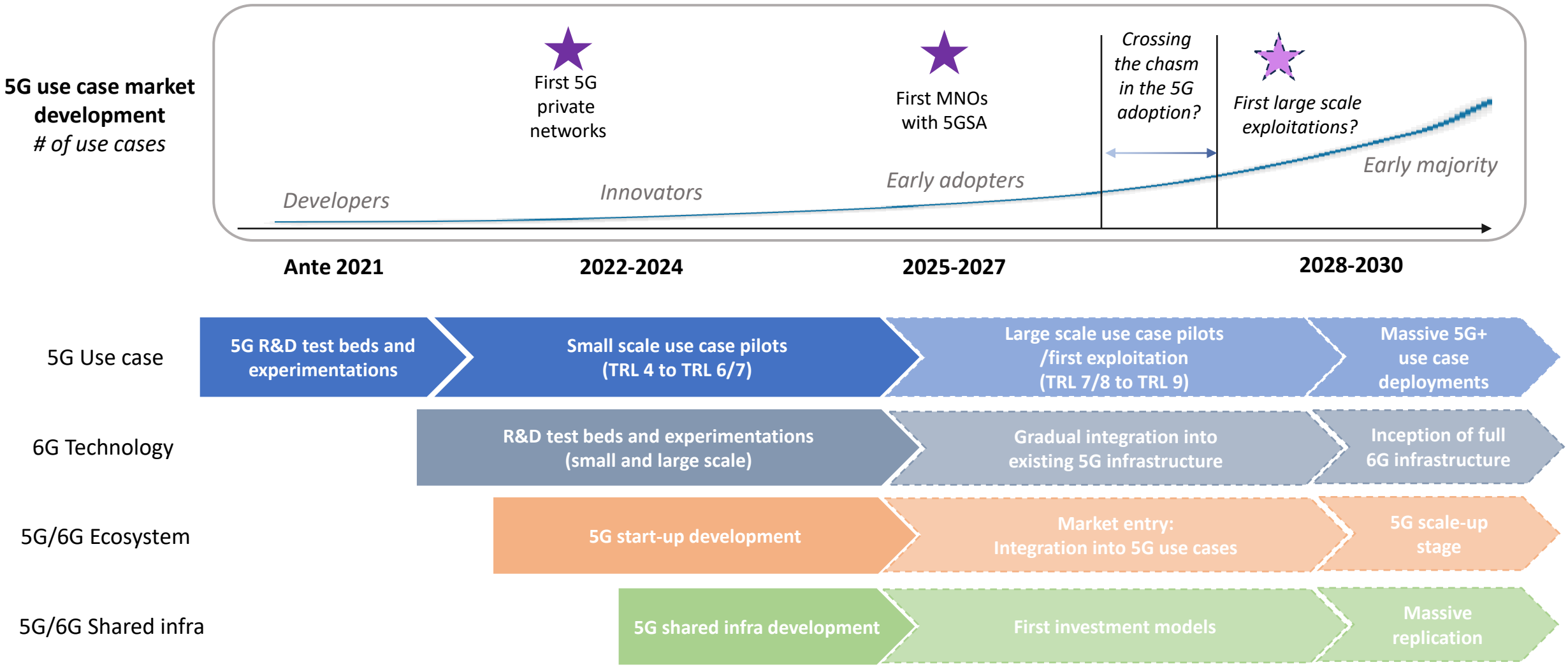
Besides grants, equity and debt instruments could accelerate 5G private investment



Source: CBO Consulting

Future funding support mechanisms for 5G Use Cases

It is time to accelerate to reach before 2030 a massive 5G uptake and to go beyond 5G



Source: CBO Consulting

Future funding support mechanisms for 5G Use Cases

Thank you!

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