



Disruptive Analysis

Don't Assume

Future Demand for Indoor Connectivity & Spectrum

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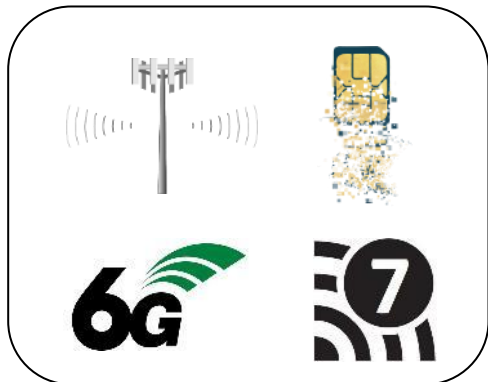


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Dean Bublely & Disruptive Analysis @disruptivedean

- Tech/telecom analyst & strategic consulting since 1991
- Covering Internet, 5G, 6G, Spectrum, FTTX, Wi-Fi, Edge/Cloud...
- Regulatory, economic, societal & geopolitical aspects of telecoms
- Advisor to telcos, large & small vendors, investors, government
- **Biases: Against monopolies, lazy incumbency & hype**



**Network Tech, Policy
& Business Models**



**Communications
Apps & Services**



Telecom-Futurism



**Industry Analyst
Consulting &
Reports**

**Whose network?
What technology?
Which spectrum?**

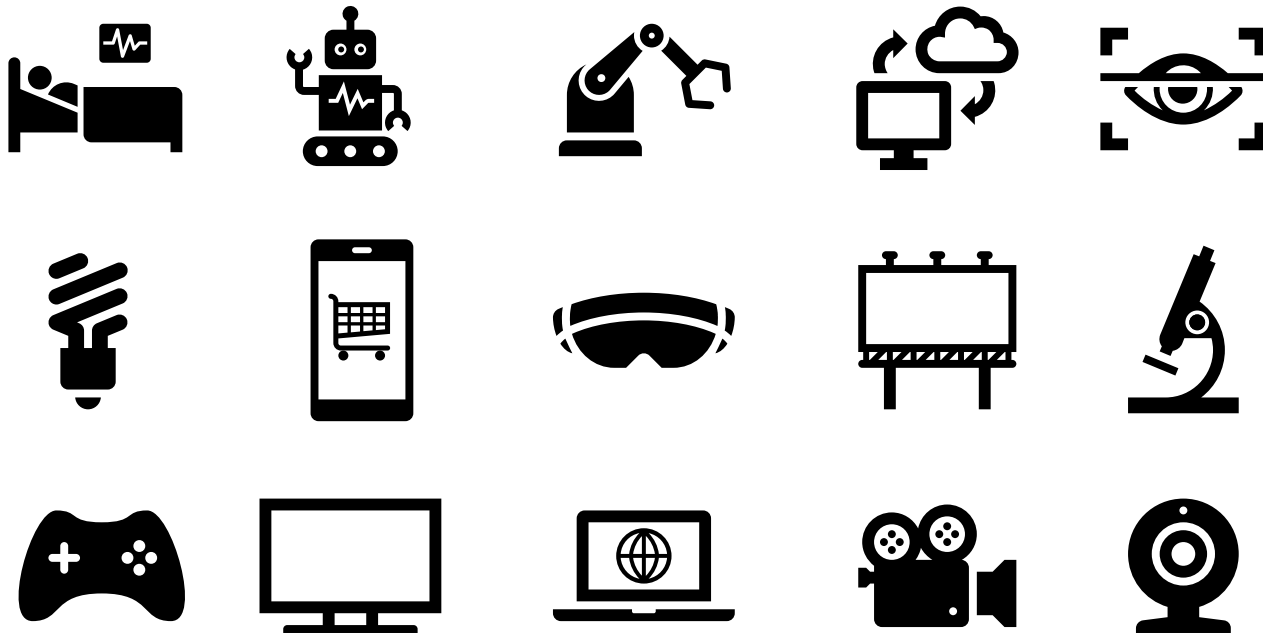


**The Paradox:
Offering public
network access on**

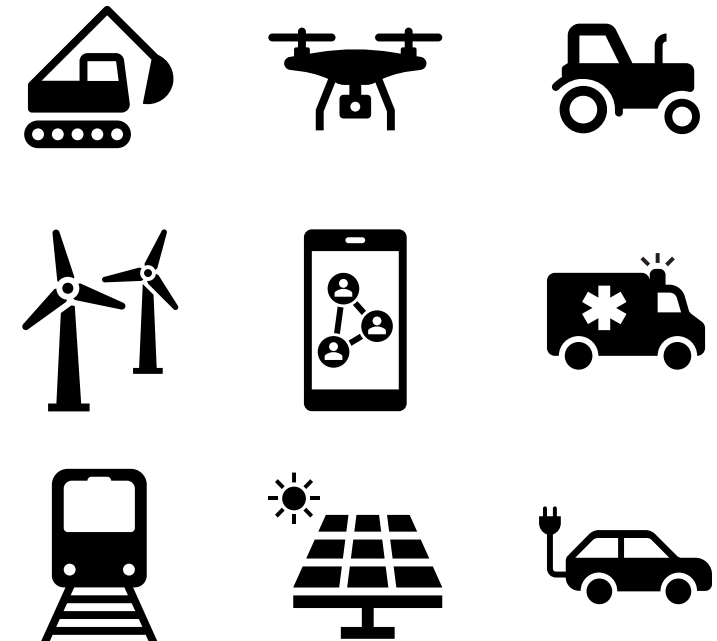


Many new B2B/B2C use-cases, apps & devices are indoors

Indoor



Outdoor

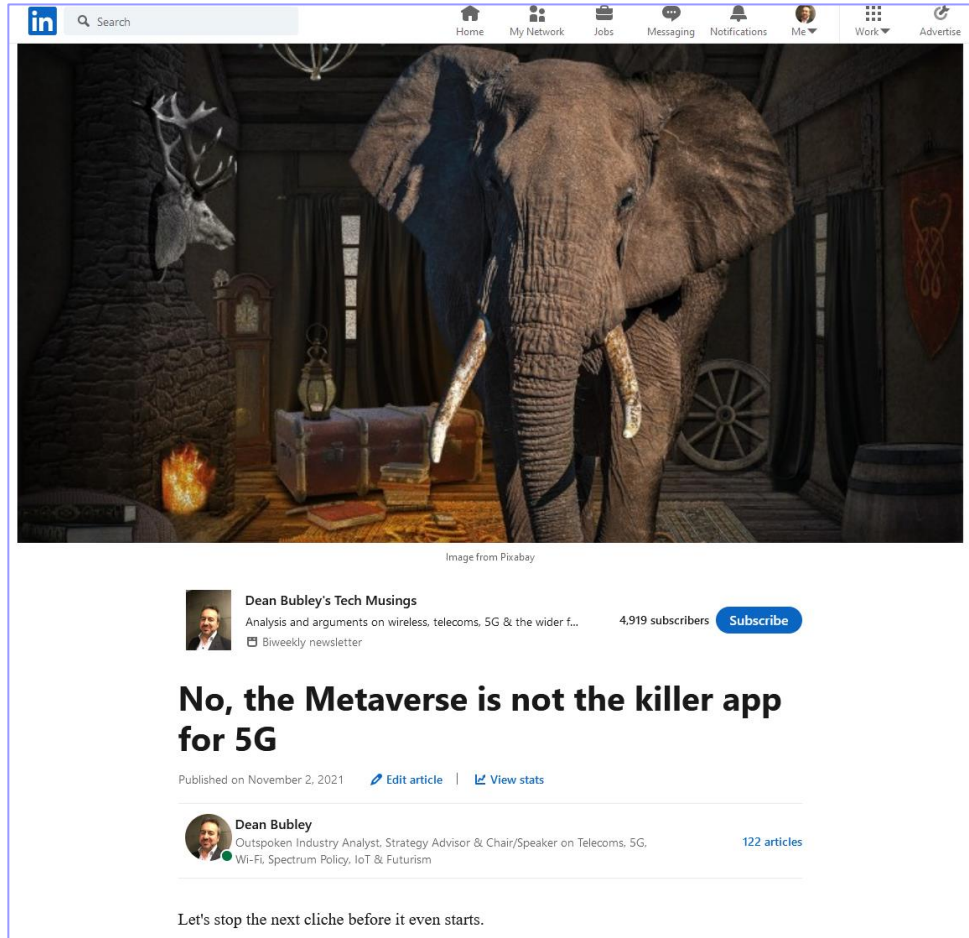


Multiple implications for positioning & timing

Telecoms vs. Pericomms underlying differences



Demanding use-cases mostly indoors



- Immersive experiences with off-device graphics rendering
- Deterministic latency eg industrial
- Dense grids of radios (eg in MDUs)
- Need for 80MHz+ channels with frequency reuse – implies full 6GHz band available
- Wireless multi-gigabit point-to-point where fibre impractical, eg using mmWave
- Easier auto-attachment – eg OpenRoaming
- Non-mainstream networking uses eg sensing / radar, specialist protocols for IoT, AV etc



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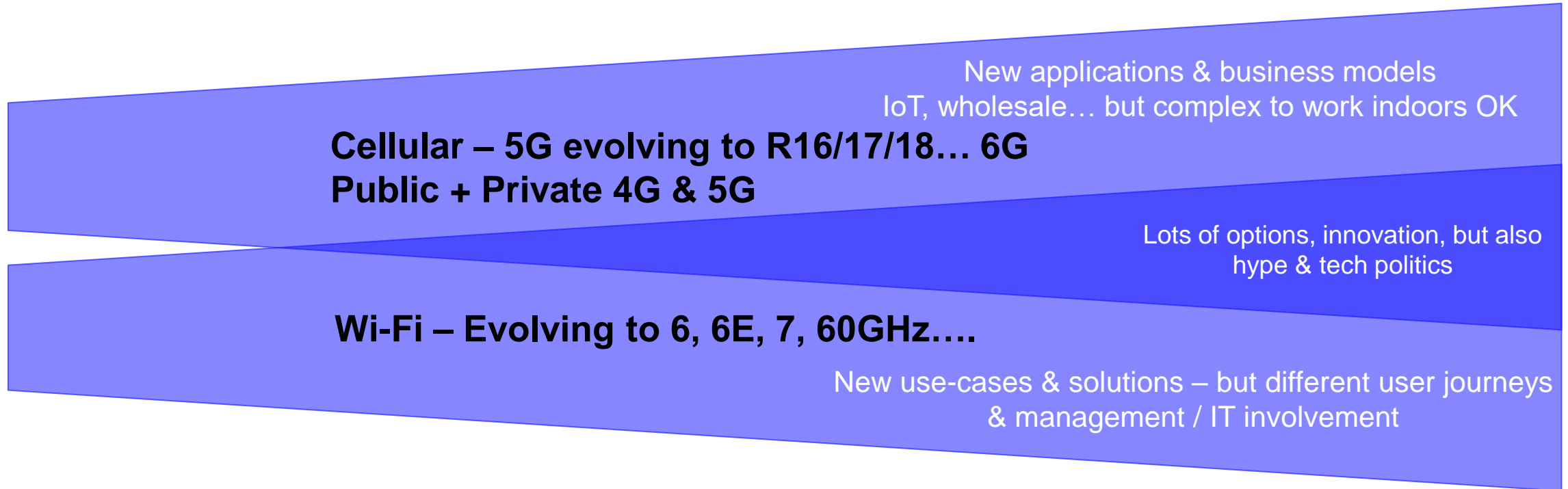
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Many enterprise indoor environments & user/device types





Indoor Wi-Fi/4G/5G may overlap, but most sites need all



2020

May 2023

2021

2022

2023

2024













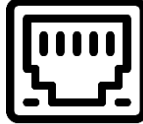



2025



2030

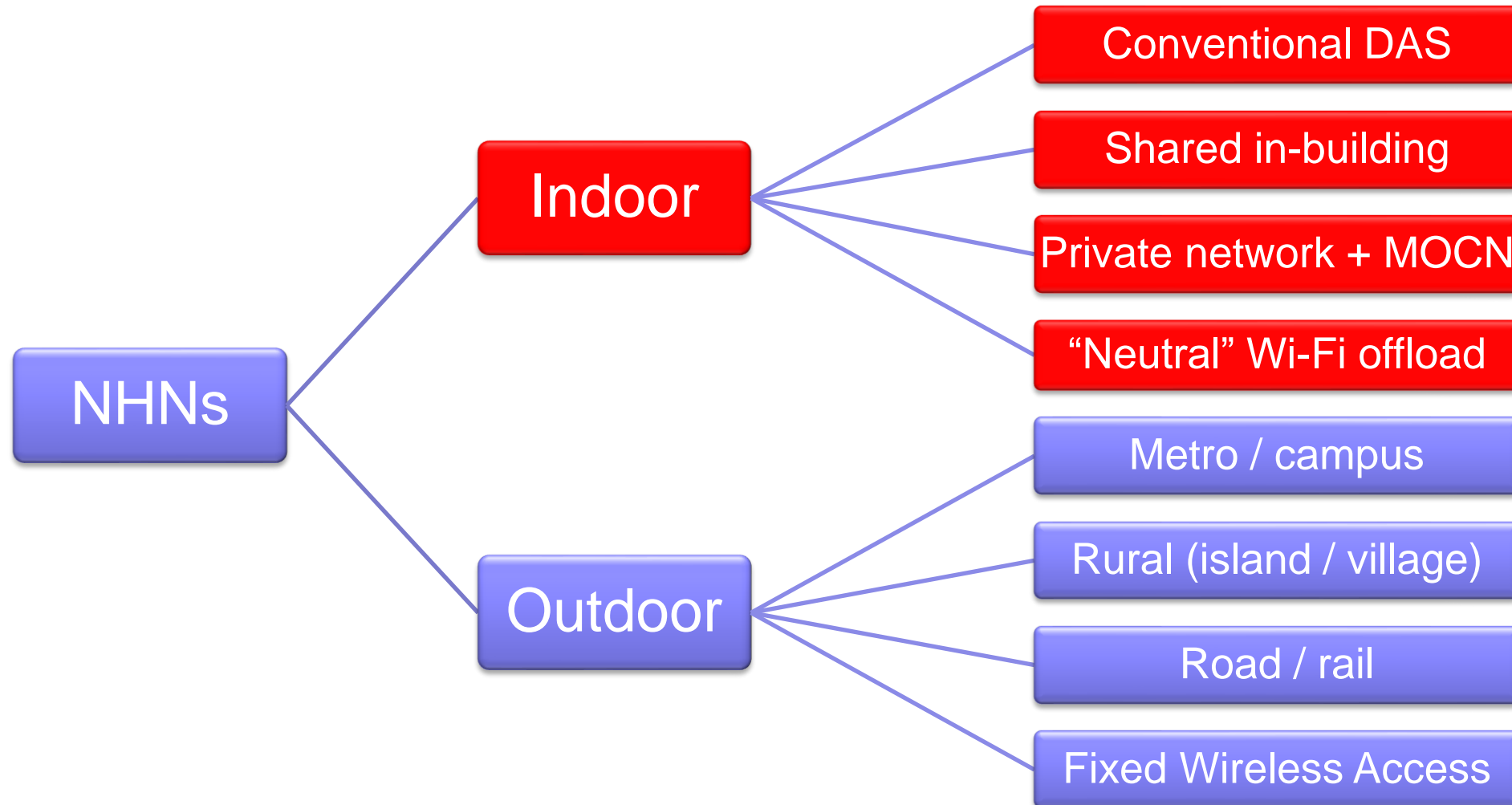


WiFi7 vs. 5G Release 17

Screens			 	
Machines	   	 	   	
	Home	Commercial	Industrial	Outdoors



Neutral host networks (wholesale infra to tenant MNOs)



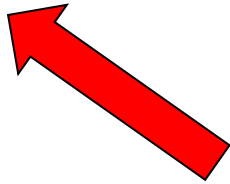


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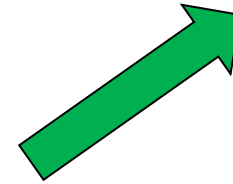
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6G approaching a fork in the road

**Max Performance &
Extreme Use-Cases**



**Max Usefulness &
Plausible Use-Cases**





Policy & regulatory considerations

- Excellent news that recent DSIT WIS mentioned indoor connectivity
- Ideally should be a specific “Indoor Wireless” vision & policy
 - For residential, enterprise, public-sector, venues etc
- Spectrum
 - Automation for local/shared access licenses for Private 4G/5G
 - Need for 6GHz for WiFi6E/7/8 & 5G NR-U
 - Consider shared band for indoor 5G (similar to China 3.3GHz)
 - Monitor adoption of 26GHz / 60GHz & tweak rules if needed
- Indoor coverage targets (eg gigabit to every room)
- Fund testbeds / competitions for indoor (5G, WiFi, DECT, other)
- Ensure low barriers for neutral-host, Wi-Fi offload & roaming etc
- Opportunistic use of indoor wireless by emergency services
- Push for 6G to be “indoor primary” by design
- Foster a UK domestic industry for indoor wireless (Open RAN, WiFi, etc)