

Go Allwhere.

Nokia / ABI Research Digitalization and 4G/5G in Manufacturing

May 2020





550,000 manufacturers in the U.S. in 2019, 6.3 million globally

Currently, there are 260 million digital factory connections, with 230 million of those connections made *via* a fixed line.

By 2023, a vast number of the 5.5 billion digital factory connections will be wireless. Most of these connections will be entirely new (AGVs, AMRs, modern HMI/IPC, sensor networks, advanced asset tracking, etc.) and supported by new wireless infrastructure, namely, private LTE and 5G.

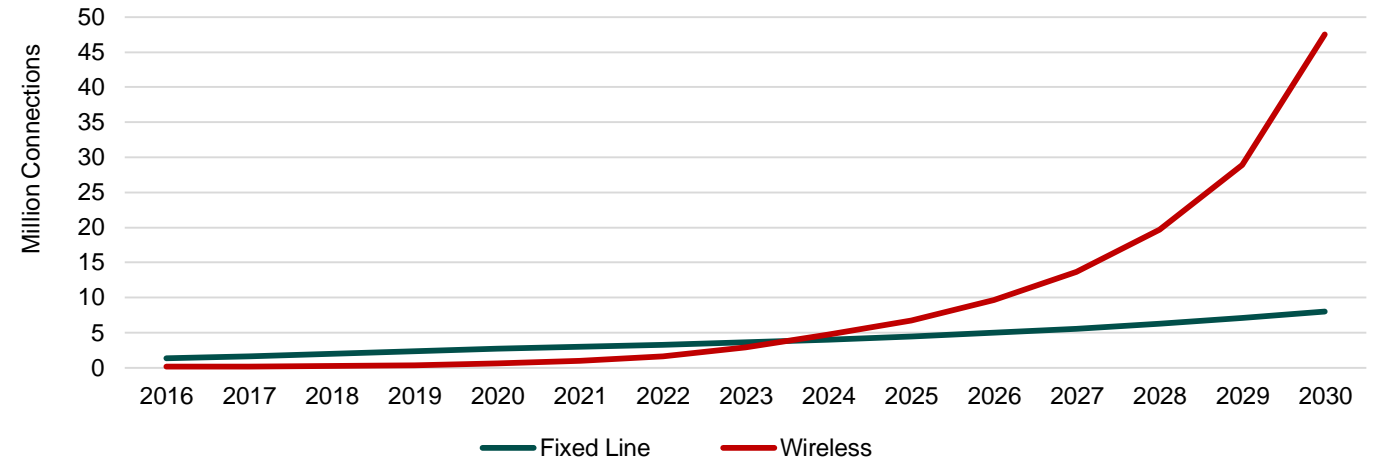
By 2030, connected machine tools such as 3D printers, Computer Numerical Control (CNC) machines, lathes, mills, and industrial drills will grow in revenues to US\$134 billion; asset tracking will reach US\$78 billion, and connected PLCs will hit US\$40 billion.

Automotive, electronics, and machinery lead in terms of the adoption of advanced manufacturing technology. For process industries other than food and beverage, most activity is in chemical, utilities, and oil and gas.

Data and analytic services is the fastest-growing segment in terms of revenue generation, reaching more than US\$185 billion in 2030, up from just US\$11 billion in 2019.

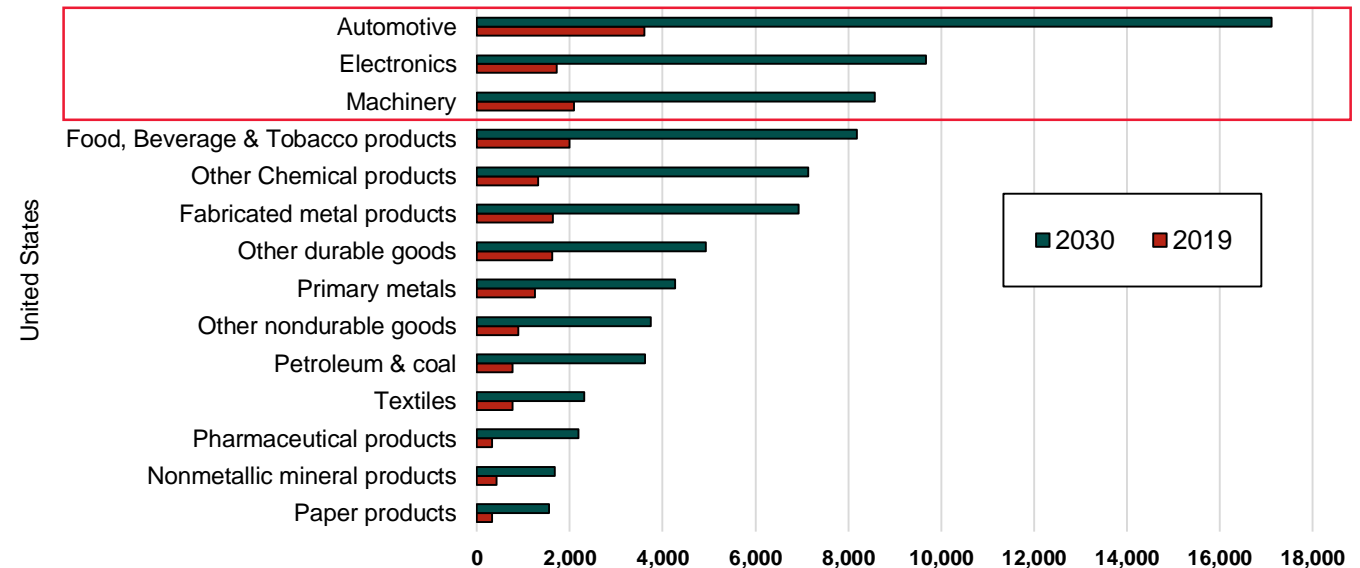
Number of Fixed Line versus Wireless Connections World Markets, Forecast: 2016 to 2030

Source: ABI Research



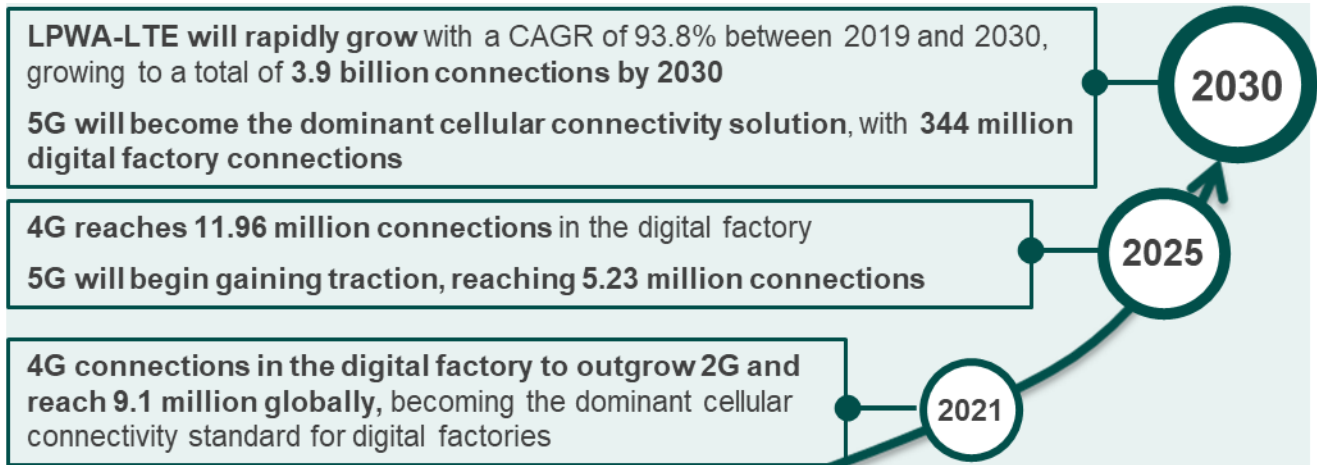
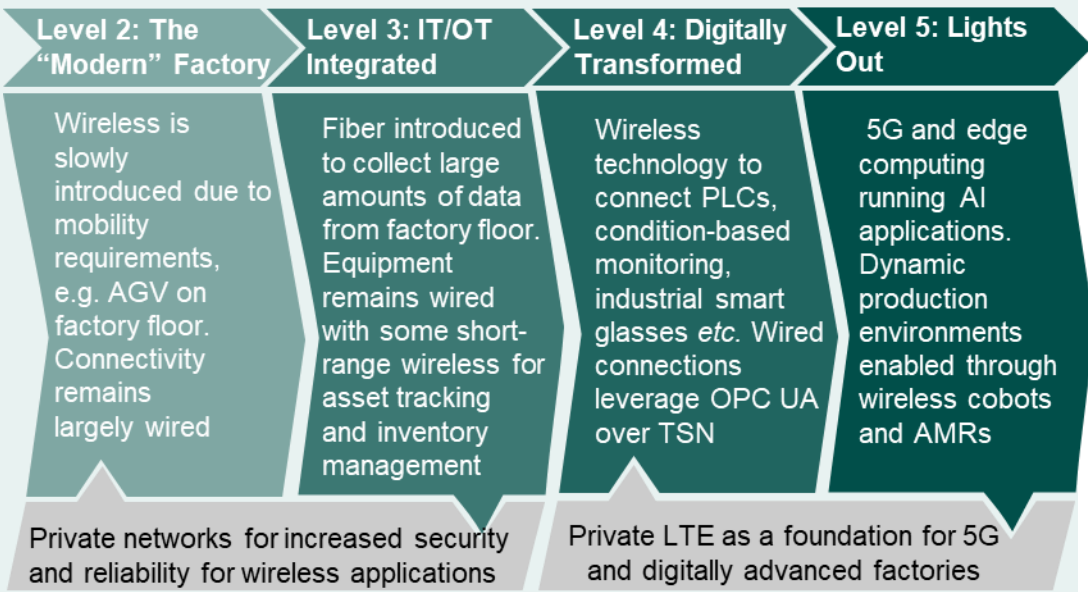
Digital Factory Revenue by Industry

Source: MD-IICT-105

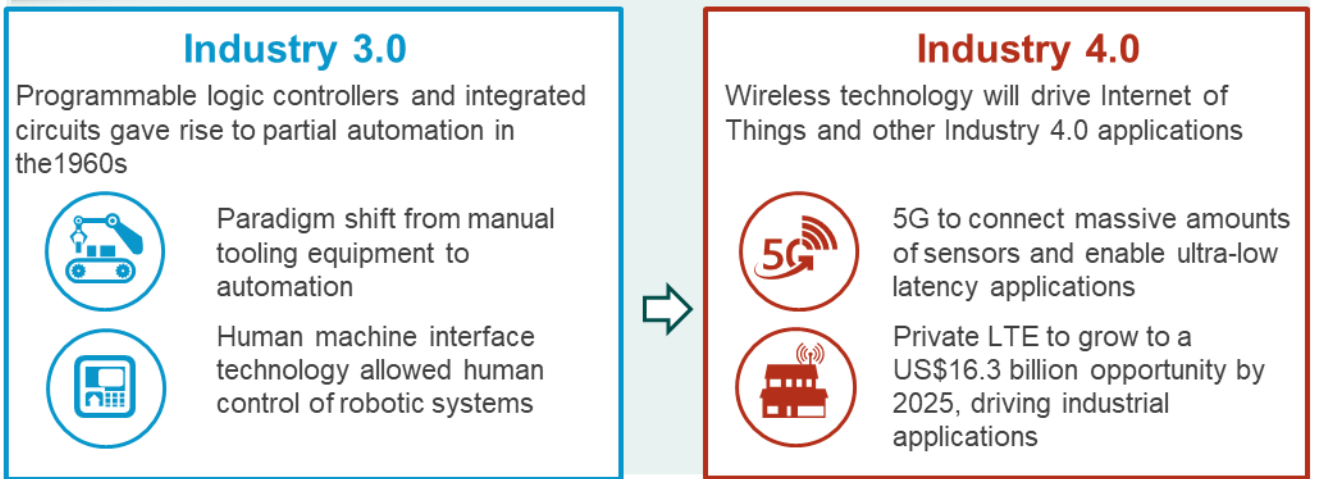


Levers of Innovation

- In 2019, the majority (86%) of global factory connections were by fixed line.
- By 2025, **global fixed line connections will decrease**, falling to 40%, and then to 14% by 2030.
- Wireless connections will grow faster than fixed line connections between 2019 and 2030:
 - Fixed Line CAGR (2019-2030): 12%
 - 4G CAGR (2019-2030): 14.7%
 - LPWAN-LTE CAGR (2019-2030): 93.8%
 - Wi-Fi CAGR (2019-2030): 29.8%
- The mature Industry 4.0 factory will require high degrees of wireless connectivity, as close to the “Level 5: Lights Out” factory as possible.



Degree of Wireless Connectivity



Scope:

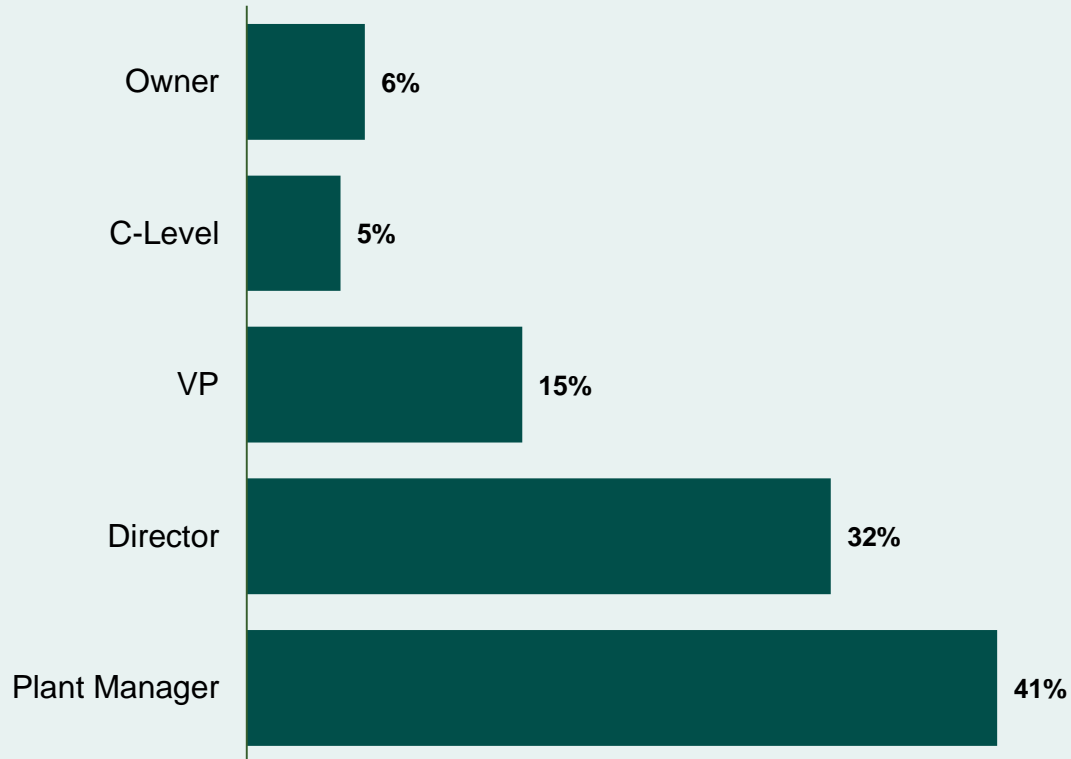
- Survey sample size 602 across automotive (201), consumer goods (201), and machinery (200) end markets.
- Survey respondents were based in the U.S. (161), Germany (100), Japan (100), China (40), India (40), Australia (40), the U.K. (41), Canada (40), and France (40).

Areas to explored:

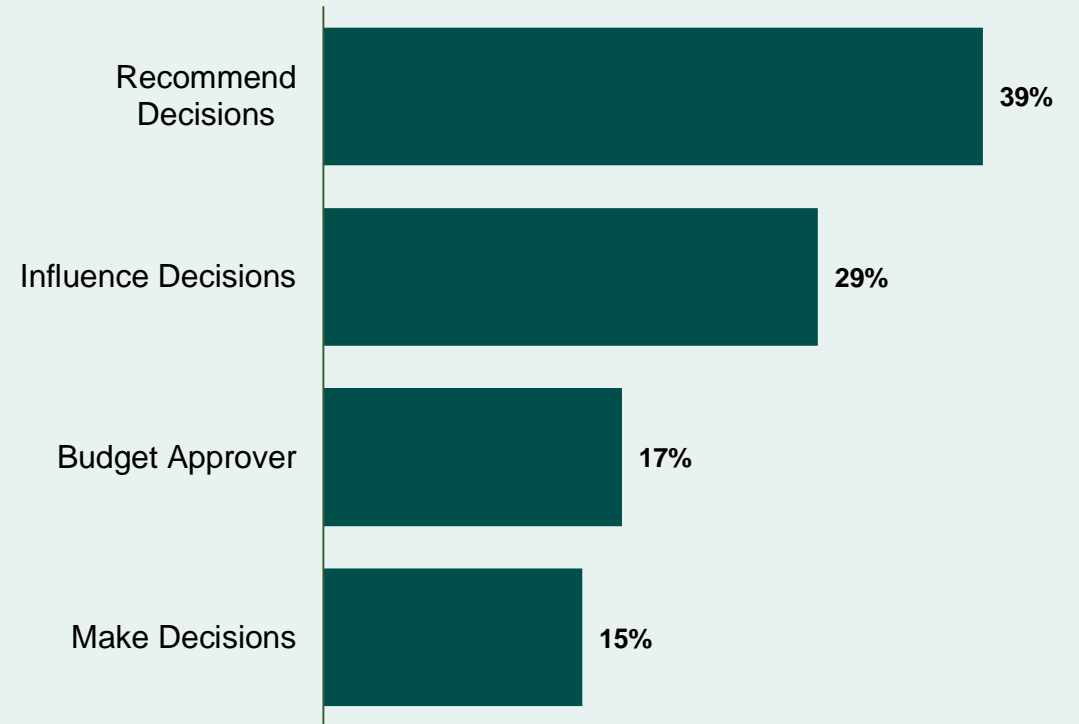
- Establish how cellular networks can augment and add significant value to the manufacturing enterprise technology stack.
- The potential addressable market and buying decision process.
- The typical position/title of key decision-makers.

Job title and role in technology related decision making

Job title



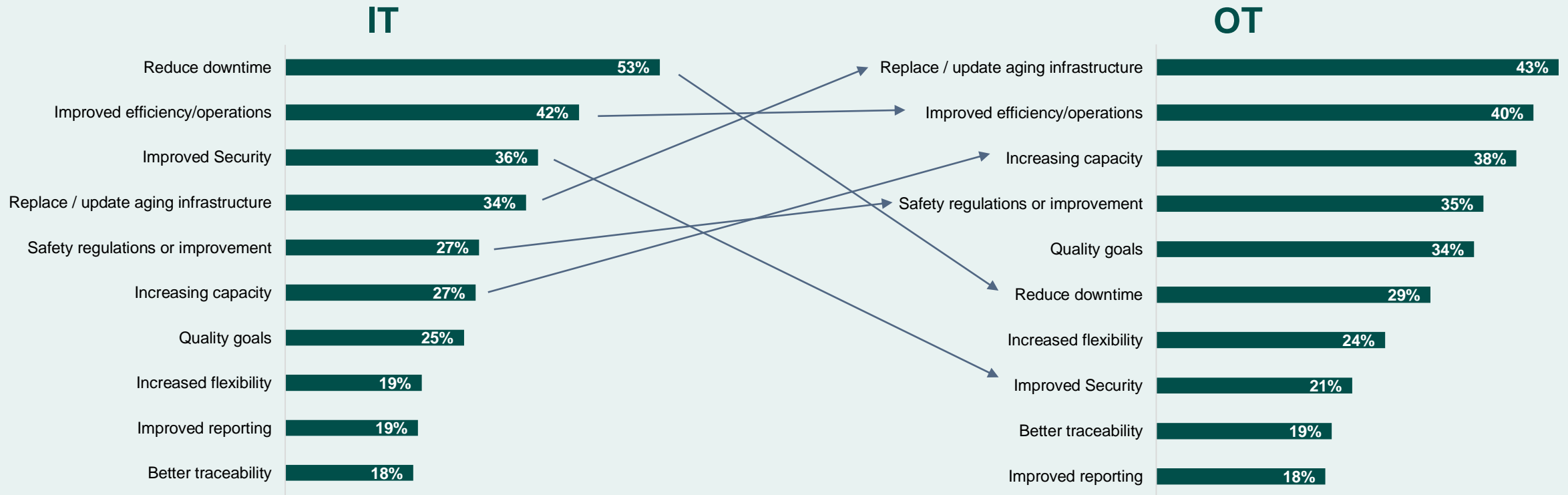
Role in the technology decision making



Base: Total (N=602)

Q. Tell us about yourself? Which of the below statements best describes your role in technology related decision making within the organization?

Drivers behind buying decisions for new industrial systems for Information Technology (IT) and Operational Technology (OT)



- **Automotive:** More likely to be concerned with increasing capacity, flexibility, and traceability. Pressure to produce high-value items.
- **Consumer Goods:** Downtime and efficiency are more pronounced. Pressure to produce high-volume items, e.g., laptops and smartphones.
- **Machinery:** Addressing aging infrastructure, quality goals, increasing capacity, and reporting capabilities. Wide ranging influences.

Base: Total (N=602)

Q. What are the key drivers behind your buying decisions for new industrial systems for Information Technology (IT) or Operational Technology (OT)?

Top buying areas you will prioritize over the next 3 years

Investment items follow on from drivers. Machine automation upgrades: avoid downtime, aging infrastructure. IIoT: avoid downtime, increase efficiency. Wireless networking is a secondary priority, but an enabler of other applications.

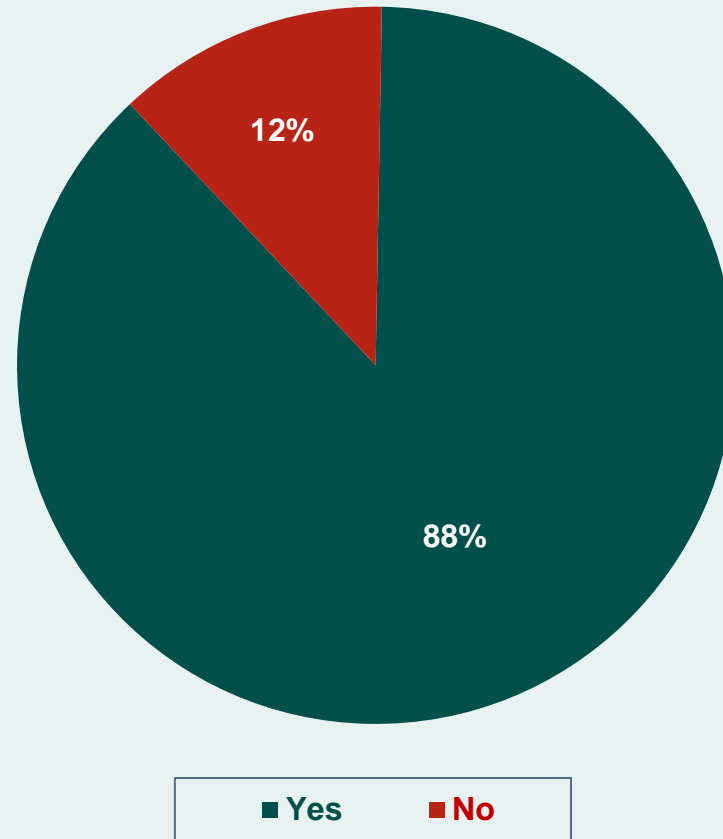


Base: Total (N=602)

Q: Which are the top buying areas will you be prioritizing over the next 3 years? (Rank 1-4, with 1 being the highest)

Familiarity with private wireless (4G/5G) networking

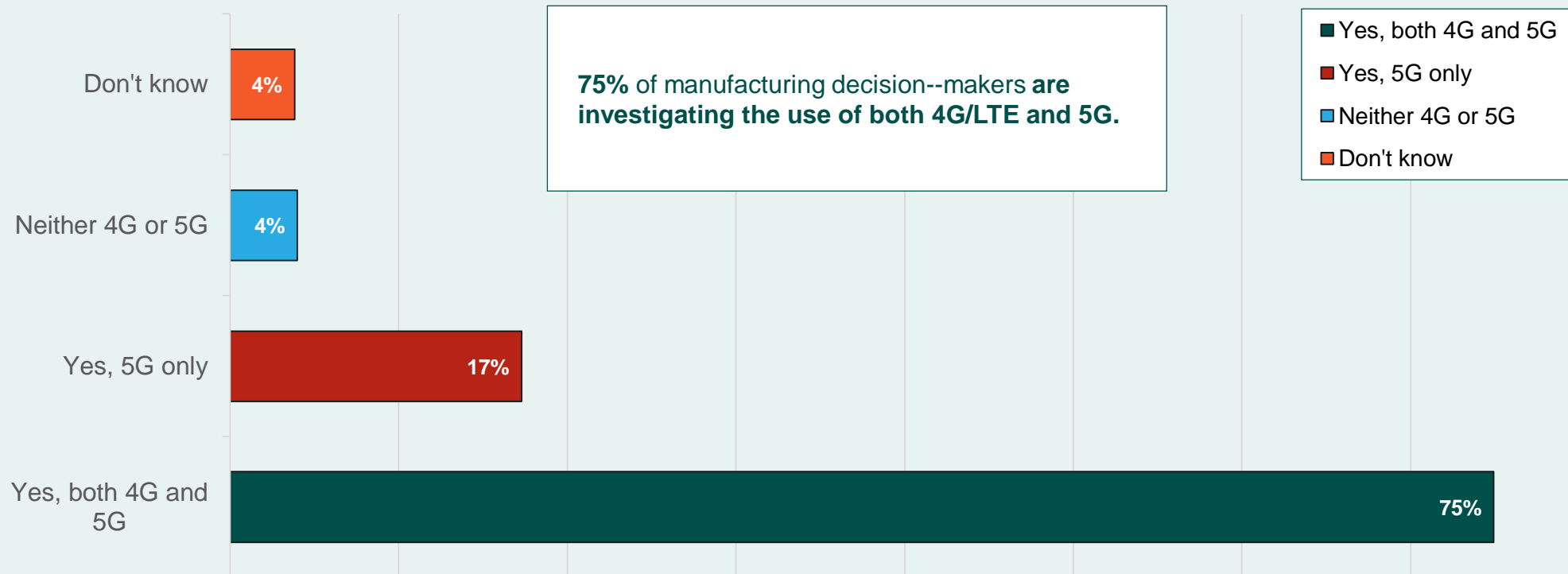
Takeaway: Knowledgeable market barriers to adoption more nuanced than simply educating the client base



Base: Total (N=602)

Q. Are you familiar with the use of private wireless (4G/5G) networking?

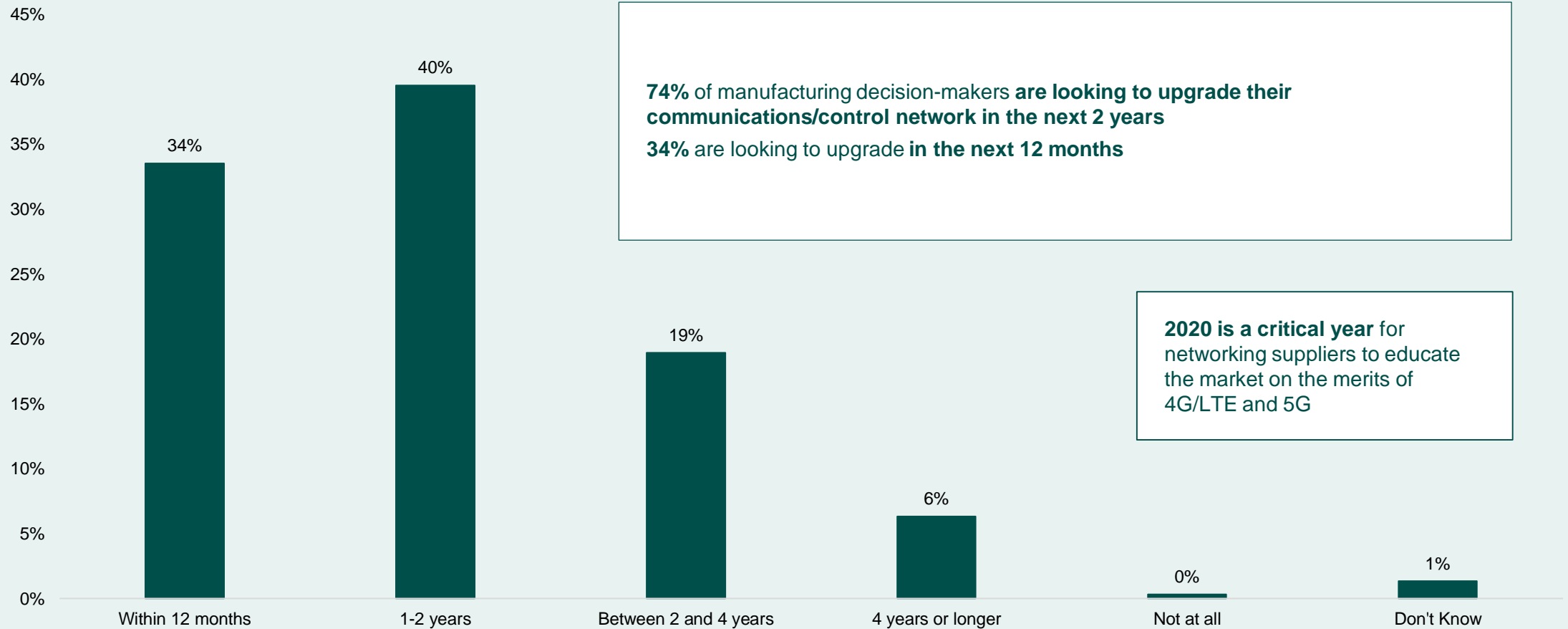
Investigating the use of either 4G/LTE or 5G in manufacturing operations



Base: Total (N=602)

Q. Is your company investigating the use of either 4G/LTE or 5G in your manufacturing operations?

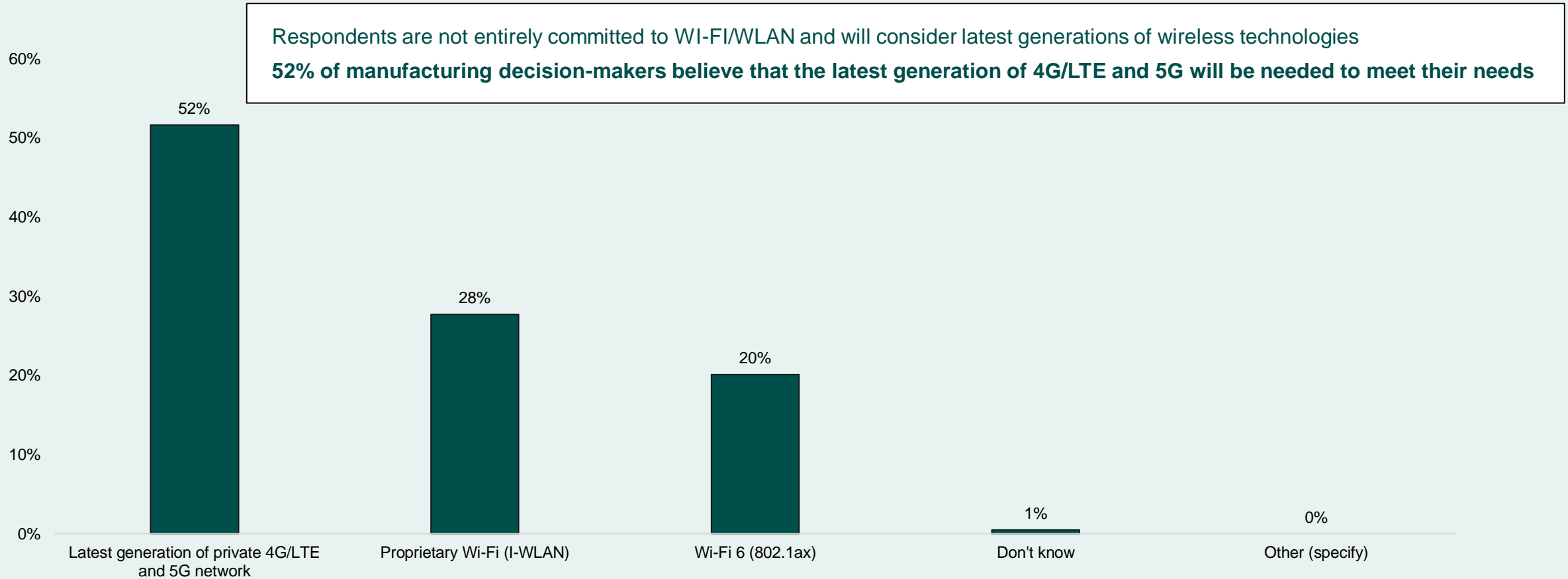
Timeline for manufacturing communications/control network upgrades



Base: Total (N=602)

Q: When are you looking to upgrade your manufacturing communications/control network?

Expectations around wireless technology adoption



Base: Total (N=602)

Q. Thinking about the requirements listed in previous question, which wireless technology do you believe will meet your future business-critical manufacturing operations?

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