
NOKIA
Networks at the nexus of new value creation
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HOW DOES TECHNOLOGY CREATE ECONOMIC VALUE?

1. Productivity growth ✓?
2. Consumer surplus ✓?
3. Longevity ✓?
4. Quality of life ✓?
5. Sustainability ✓?

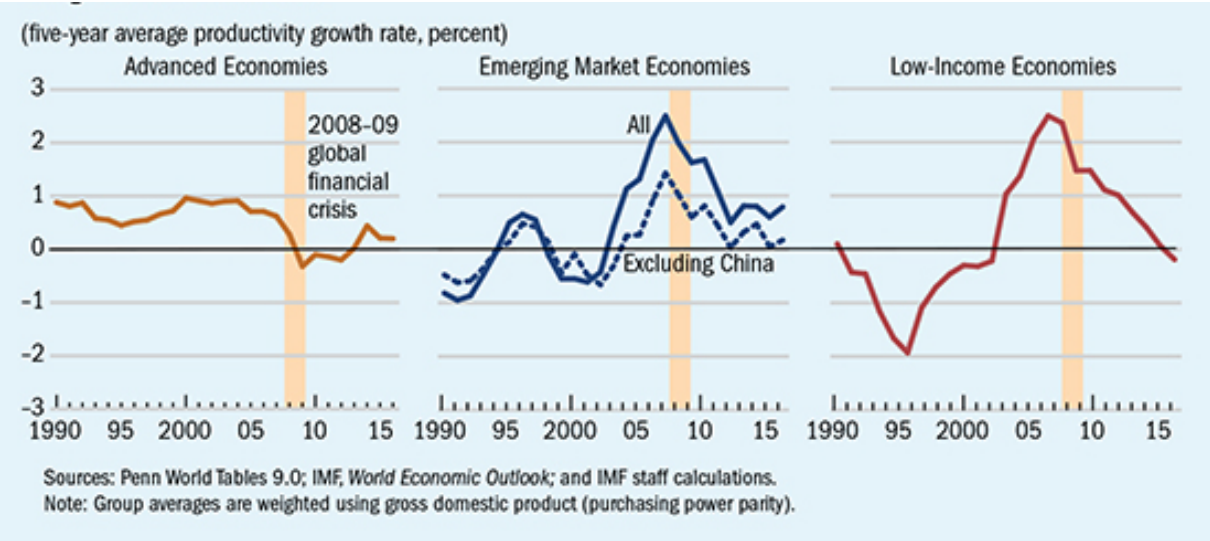
THE IMPERATIVE

"Productivity isn't everything, but
in the long run it is almost everything"

Paul Krugman

THE PRODUCTIVITY PARADOX

Dramatic slowdown in productivity growth
Despite accelerating technology progress



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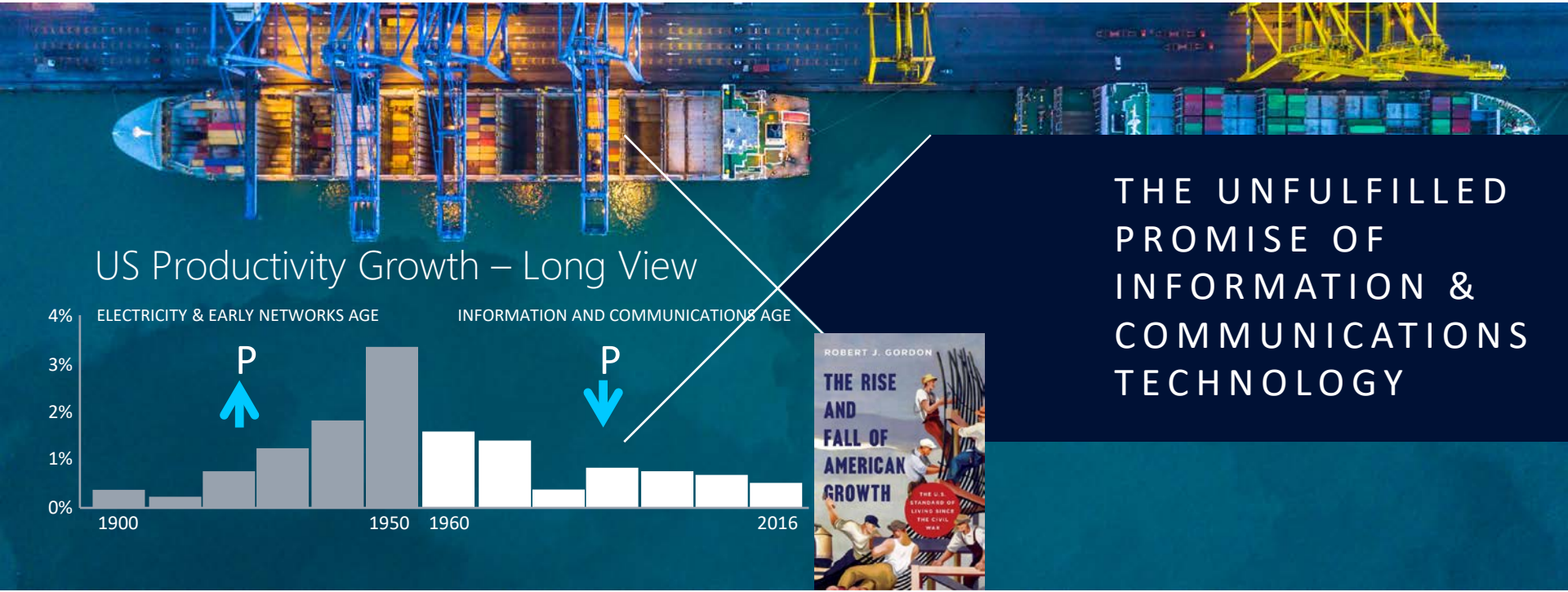

THE UNFULFILLED PROMISE OF INFORMATION & COMMUNICATIONS TECHNOLOGY

US Productivity Growth – Long View

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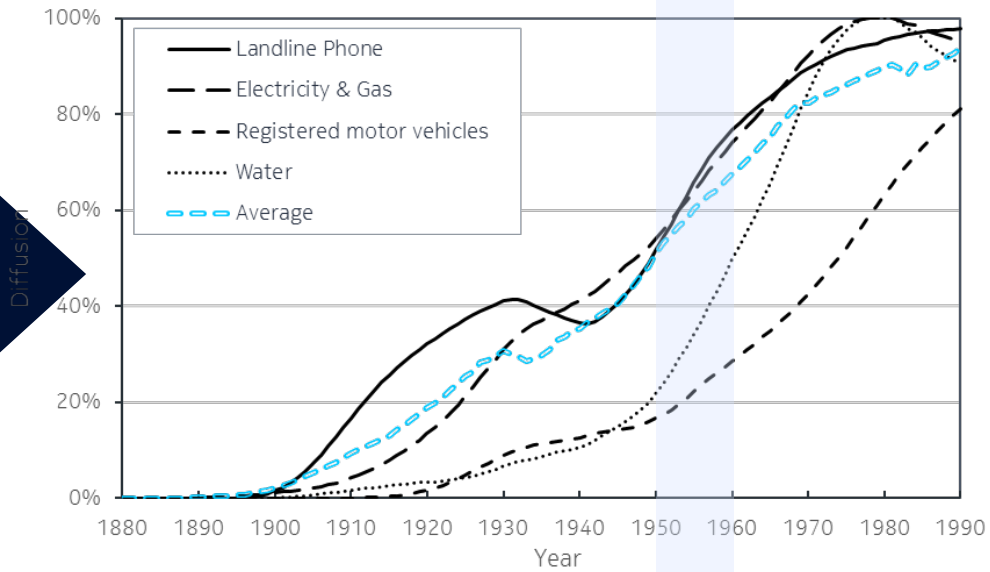
“NETWORKS” AT THE NEXUS OF PAST VALUE CREATION

Diffusion for Four Network Infrastructures in the US



Decade of Productivity Boom in the US

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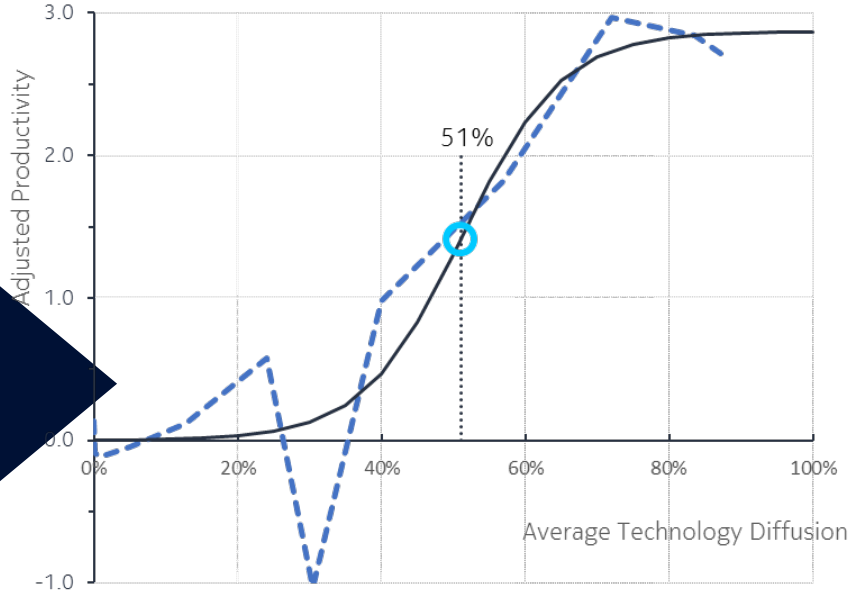
NETWORKS MAGIC:

1. HEALTH
2. ENERGY
3. TRANSPORTATION
4. COMMUNICATIONS



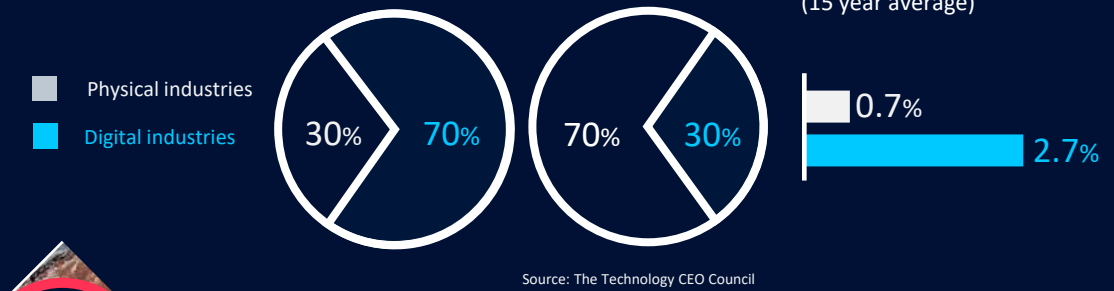
COMPARISON

- US: (1951, 51%)
- CHINA: (2004, 69%)
- INDIA: (2005, 58%)

TALE OF TWO ECONOMIES

75% of Work-force

Manufacturing, Transportation, Agriculture, Construction, Mining, Utilities, Healthcare, …



Source: The Technology CEO Council

25% of Work-force

Tech, Media, Finance, Insurance, Professional Services, …

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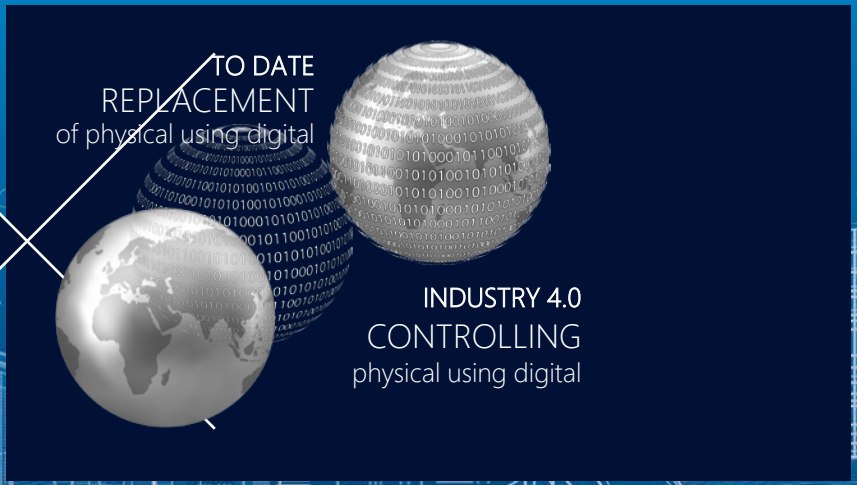
THE JOURNEY TO INDUSTRY 4.0



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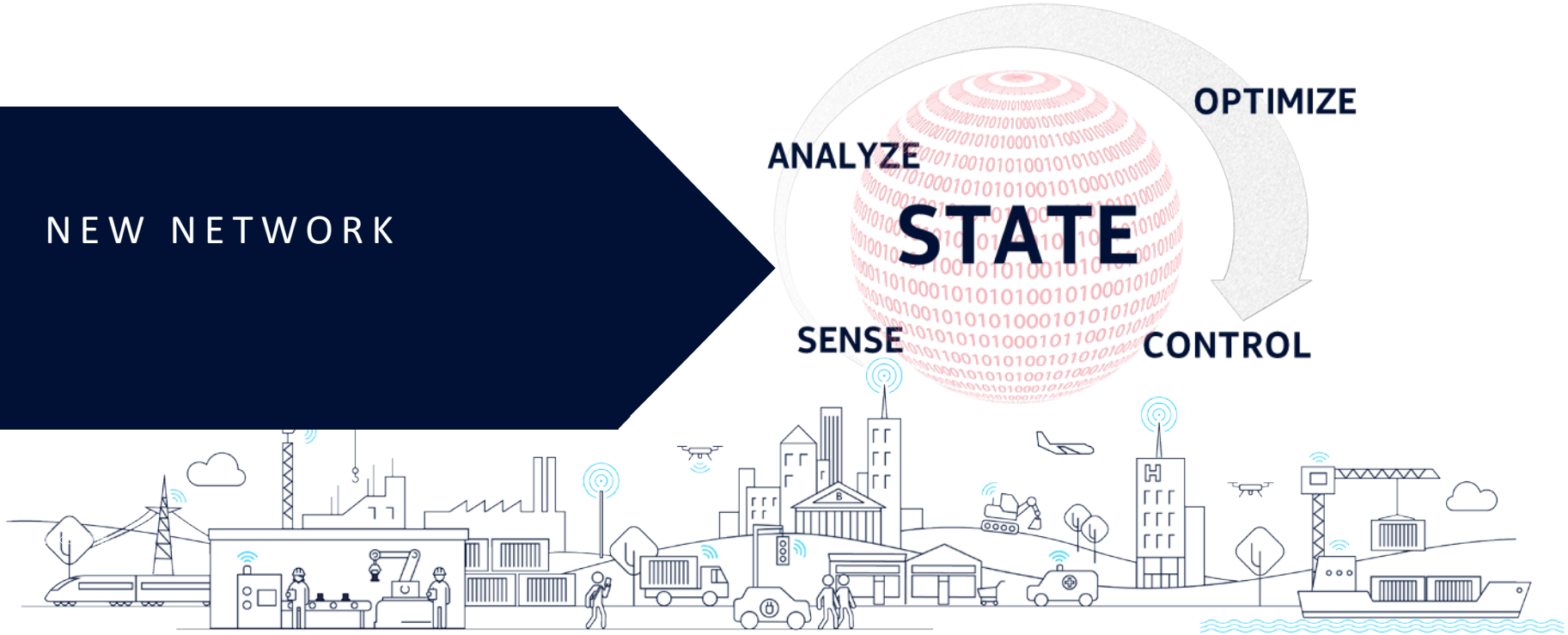
Reach | Mobility | Performance | Reliability | Security

NEW NETWORK



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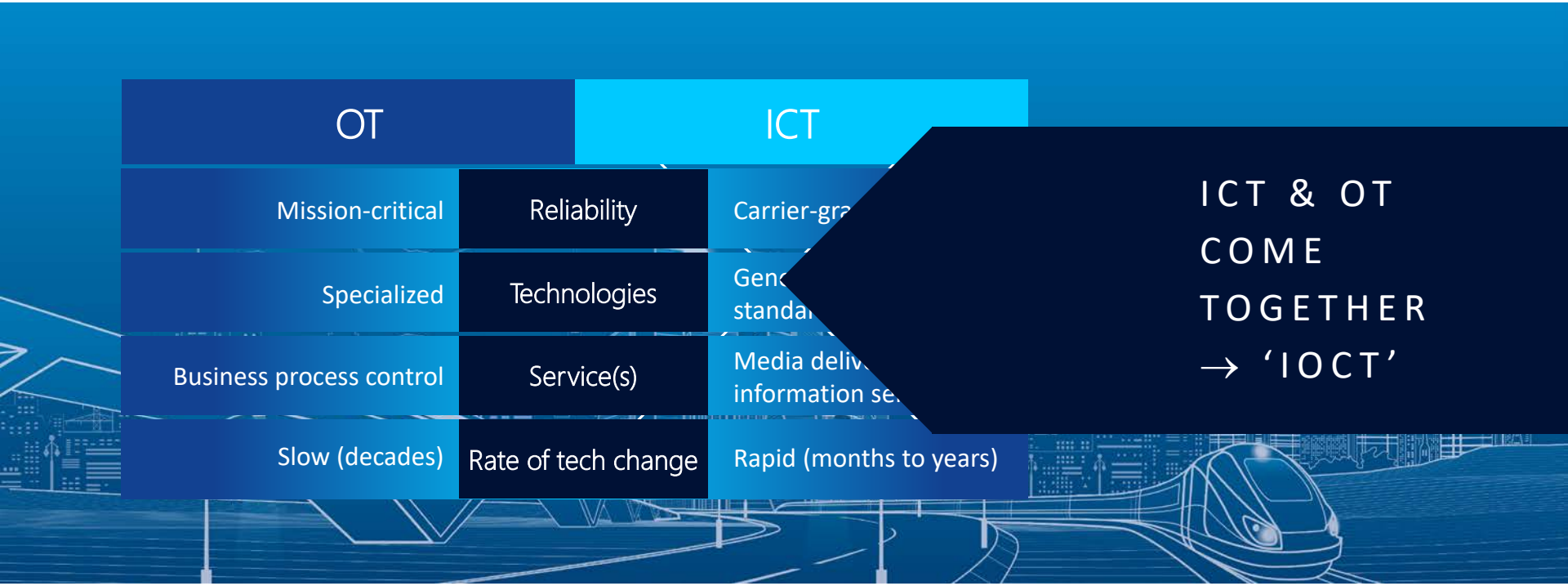
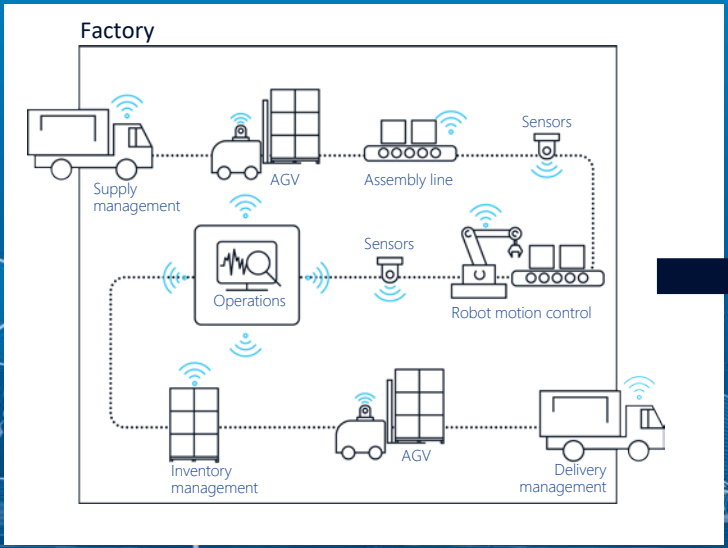

OT
ICT
Mission-critical
Reliability
Carrier-gra
Specialized
Technologies
Gen
standa
Business process control
Service(s)
Media deliv
information se
Slow (decades)
Rate of tech change
Rapid (months to years)
ICT & OT
COME
TOGETHER
→ 'IOCT'



Use case		Availability	Cycle time (ms)	Payload size (bytes)	# of devices	Service area
Motion control	Printing machine	>6 x 9's	<2	20	>100	100 m
	Machine tool	>6 x 9's	<0.5	50	~20	3 m
	Packaging machine	>6 x 9's	<1	40	~50	3 m
Mobile robots	Cooperative motion control	>6 x 9's	1	40-250	100	<1 km^2
	Video-operated remote control	>6 x 9's	10-100	15-150	100	<1 km^2
Mobile control panels with safety functions	Assembly robots or milling machines	>6 x 9's	4-8	40 -250	4	10 m
	Mobile cranes	>6 x 9's	12	40 -250	2	50m
Process monitoring		>4 x 9's	>50	Variable	10,000 devices per km^2	

End-to-End Network for End-to-End Automation

NOKIA FUTURE X
NETWORK
ARCHITECTURE

Networks at the nexus of next value creation

NETWORKS MAGIC - PAST

1. HEALTH
2. ENERGY
3. TRANSPORTATION
4. COMMUNICATIONS

NETWORKS MAGIC - FUTURE

1. SMART HEALTH
2. SMART ENERGY
3. SMART TRANSPORTATION
4. SMART MANUFACTURING
5. **SMART COMMUNICATIONS**

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