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## Equity Research Division

### Nokia Corporation

Mobile, Fixed & Cloud Network Solutions Provider

**Target Price: \$5.61**

Current Price: \$3.61

Upside Potential: **+55.40%**

**Recommendation: BUY**

**Investment Horizon: 7 Years**

Vienna, 31/01/2024

# Team Overview

## Equity Research



**Ilinca  
Suciu**

**Head of Equity  
Research**

- Task distribution
- Story guideline

McKinsey  
& Company

 **Raiffeisen Bank  
International**

**Bitdefender**

BSc. (WU) – 6<sup>th</sup> Sem.



**Oleh  
Bei**

**Associate**

- Business Model
- Strategy







BSc. (WU) – 8<sup>th</sup> Sem.



**Filip  
Kindermann**

**Associate**

- Valuation
- ESG







BSc. (WU) - Finished



**Kateryna  
Tretyakova**

**Associate**

- Industry Analysis
- Competitor Analysis





MSc. (WVPU)



**Maximilian  
Joos**

**Analyst**

- Valuation
- Financial Analysis





BSc. (WU) – 4<sup>th</sup> Sem



**Ruggero  
Prodi**

**Analyst**

- Business Model
- Strategy





MSc. (WU) – 3<sup>rd</sup> Sem



**Maximilian  
Panagl**

**Analyst**

- Industry Analysis
- Competitor Analysis







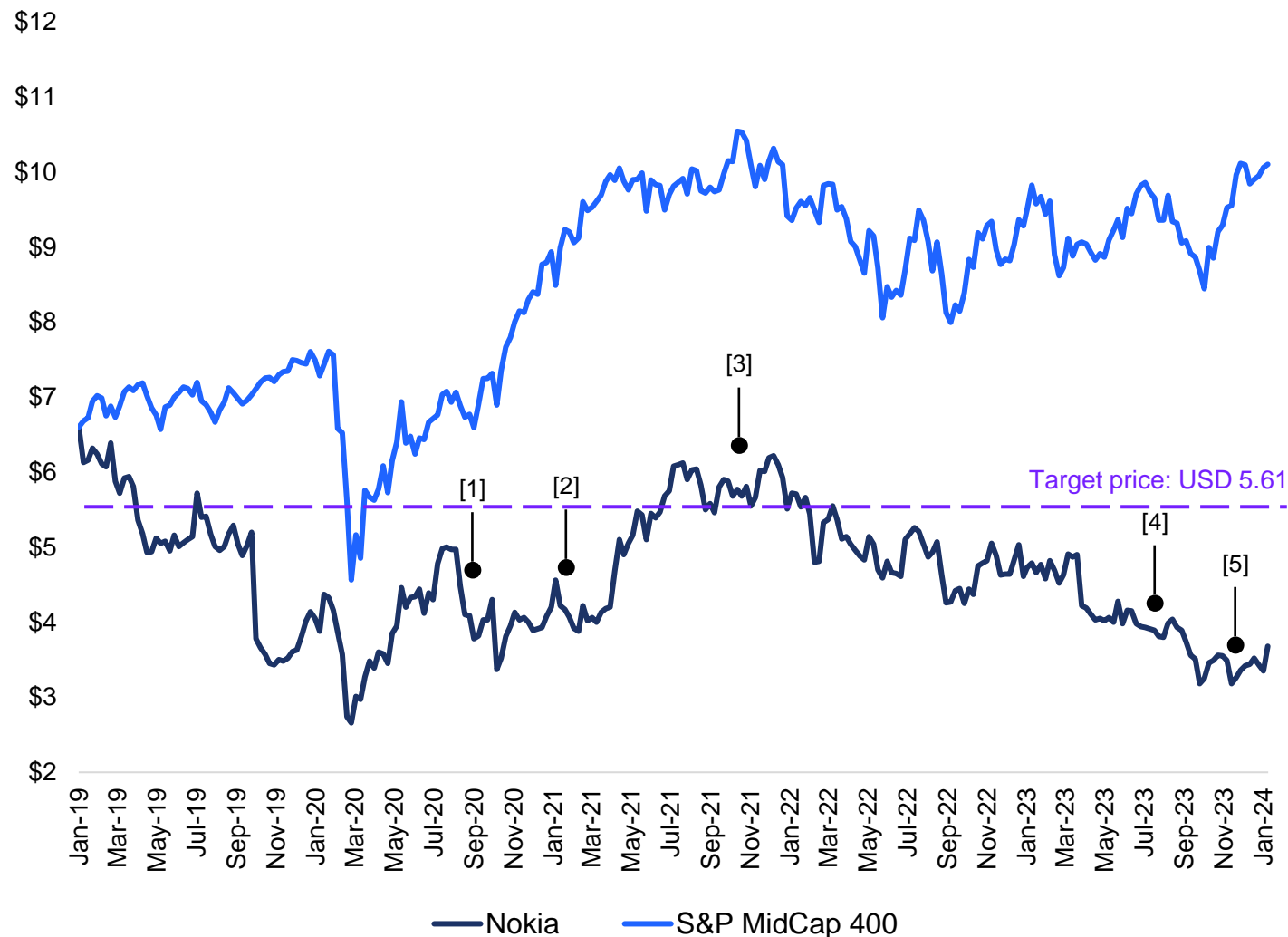
BSc. (WU) - Finished

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|  |                              |    |
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|  | Investment Thesis            | 5  |
|  | Company Overview             | 6  |
|  | Business Model and Strategy  | 9  |
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# Share Price Performance

Suffering shareholder returns due to macroeconomic events and strong competition



## Major Deals

- [1] September 2020 (-25%): Verizon switches to Samsung (\$6.6bn deal)
- [2] January 2021 (+30%): T-Mobile confirms Nokia
- [3] February - November 2021 (+40%): Reorganization of business groups, introduction of Software-as-a-Service, first trials in India
- [4] July 2023 (+10%): Jio (India) chooses to Nokia (\$1.7bn deal)
- [5] December 2023 (-15%): AT&T switches to Ericsson (\$14bn deal)

## Key Stats

- **IPO:** January 1995 (HLSE)
- **Ticker:** NOK (NYSE)
- **Close (January 31):** USD 3.68
- **52-week-range:** USD 2.94 – 4.97
- **Market Cap:** USD 20.93 bn

Nokia's strategic turnaround propelled it to renewed dominance in the telco equipment industry

## Key investment highlights



1

Nokia has established itself as a **prominent pioneer** in the realm of 5G technology, which translates into more **long-term service agreements** with CSPs

2

Ban of **Chinese** vendors in the **EU** and **US** awards Western-based telco equipment companies with **additional market potential**

3

The shift towards **more cloudification** in the telecommunication industry places Nokia on the edge with its "**Network as a Code**" offering

4

Nokia's timely implementation of a **cost-saving program** proved **instrumental** in mitigating the challenges posed by an unstable macroeconomic environment

5

Nokia is operating in the **fiercely competitive industry** with Ericsson, the **biggest European player** in telco equipment industry

6

Due to supply chain shortages back in 2021-2022 CSPs have been gathering **excess inventories**, leaving Nokia without lucrative sales during 2023





# **Nokia Corporation**

**WUTIS – Equity Research**

## **Company Overview**

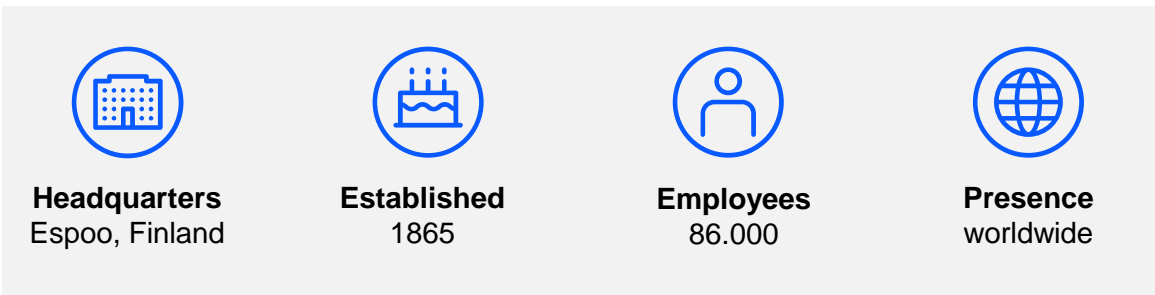


# Business Overview

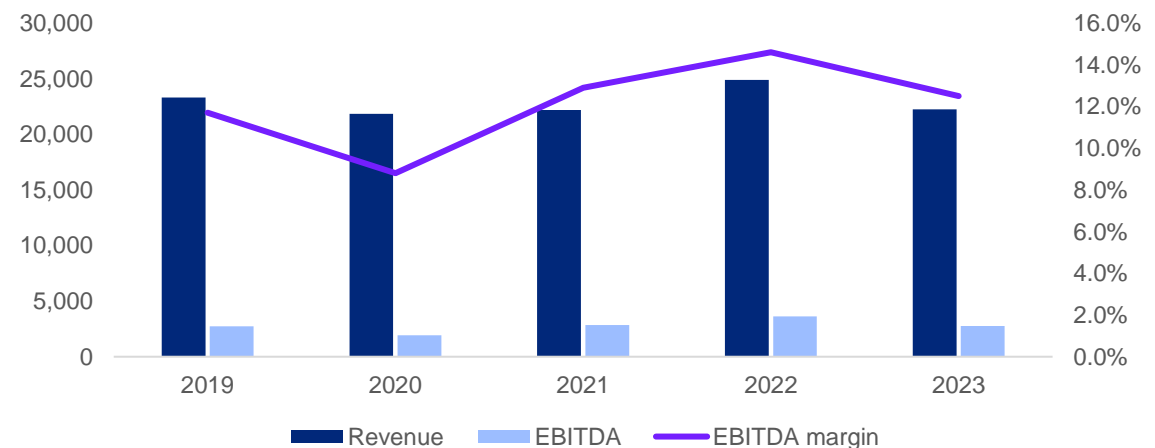
Iconic brand, ready to cover new grounds with newly appointed management team

## Business Description

Nokia Corp. is a global developer of **telecommunication equipment** and IT solutions, leader in 5G technology, operating in 4 main segments: Mobile Networks, Network Infrastructure, Cloud Network Services and Nokia Technologies.



## Financials (in EUR mn)



Source: Nokia, CapitalIQ

## Management Team



**Pekka Lundmark**  
CEO since 2020



**Nishant Batra**  
CSTO since 2021

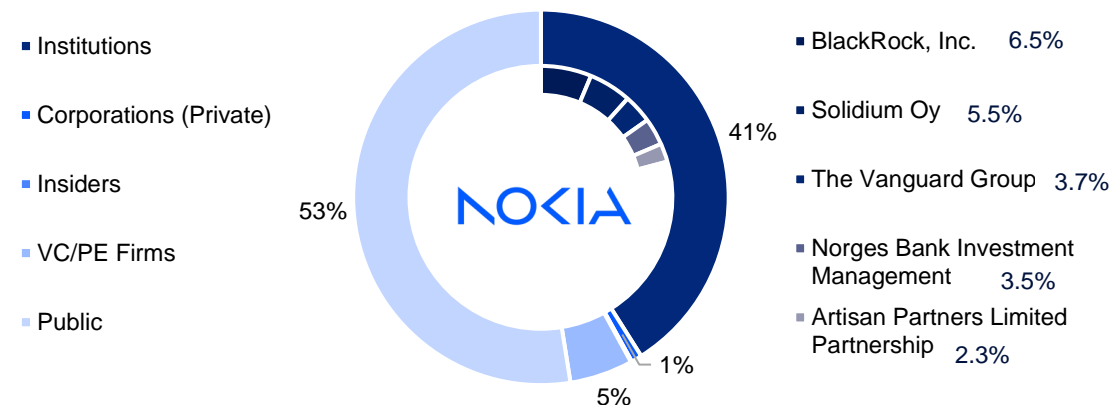


**Marco Wirén**  
CFO since 2020



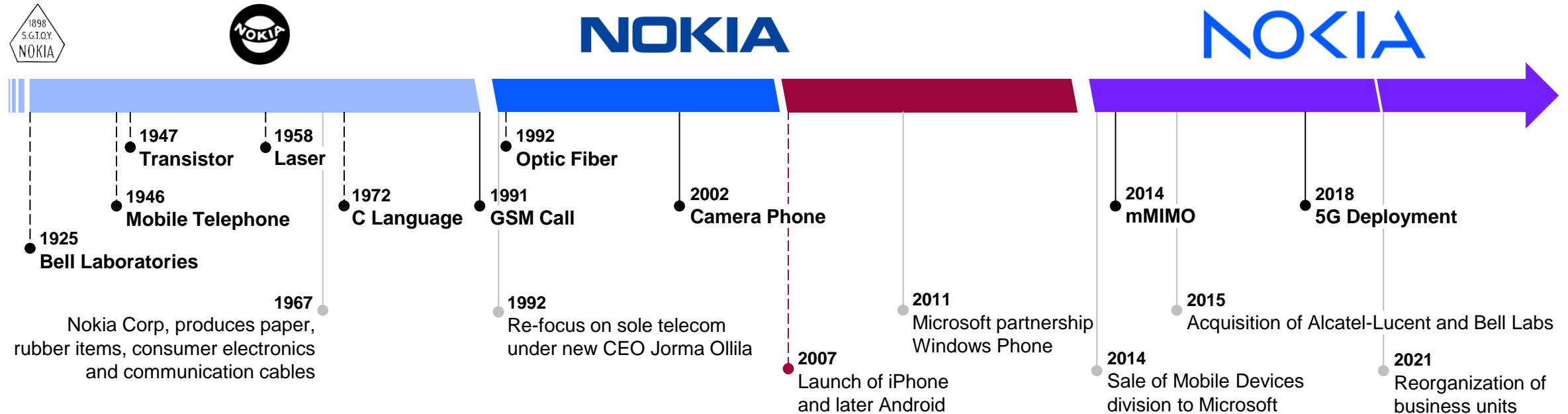
**Terence McCabe**  
CTO Asia Pacific Japan since 2021

## Shareholder Structure



# Nokia's Evolution

Once the first mover in the cell phone industry, Nokia's innovation crisis forced the company to reorganize



## Innovator's Dilemma

Nokia pioneered 1G, 2G and 3G mobile industry, becoming the leading cell phone seller between 1996 and 2010, with revenues increasing from 6 to 42bn EUR.

However, Nokia made several mistakes:

- Overlooked **North America**
- Underestimated the importance of iPhone and Android's **software ecosystem** (Nokia's Ovi online store closed to 3<sup>rd</sup> party developers), holding onto its old Symbian OS first and Windows Phone after
- Worsening **internal politics**, business units concerned only about own survival

## Radical Change Needed

- Nokia re-focused (again) on **telecom alone**, but this time only on **B2B** connectivity, abandoning consumer mobile devices
- Rode the 5G wave in North America and Europe with **CSPs**, now slowly shifting focus to **Enterprise** customers' needs and towards East
- Nokia's strategic change to B2B still needs public recognition: **rebranding** efforts culminated with new logo in 2023
- Nokia is still innovative, just within a narrower scope than before





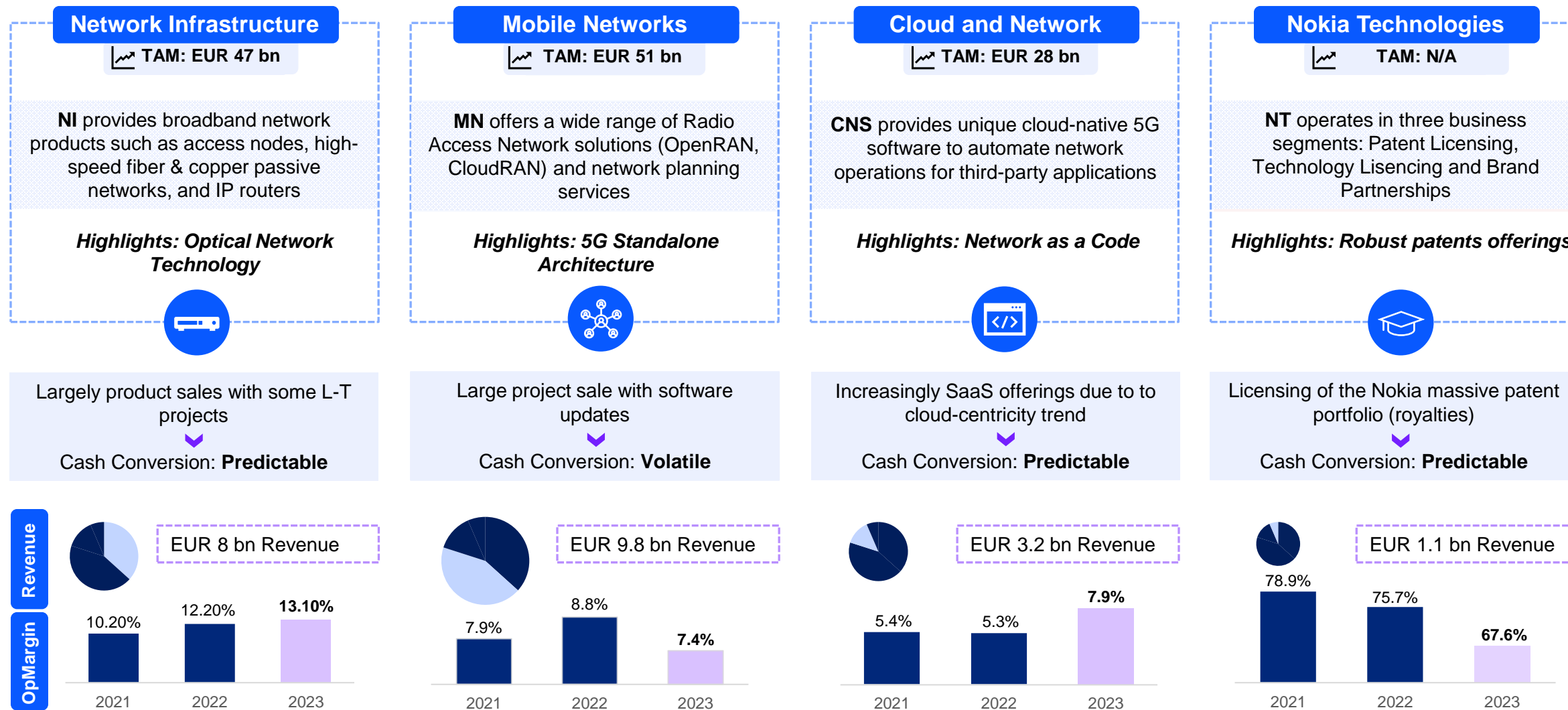
# **Nokia Corporation**

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## **Business Model and Strategy**

# Business Model I

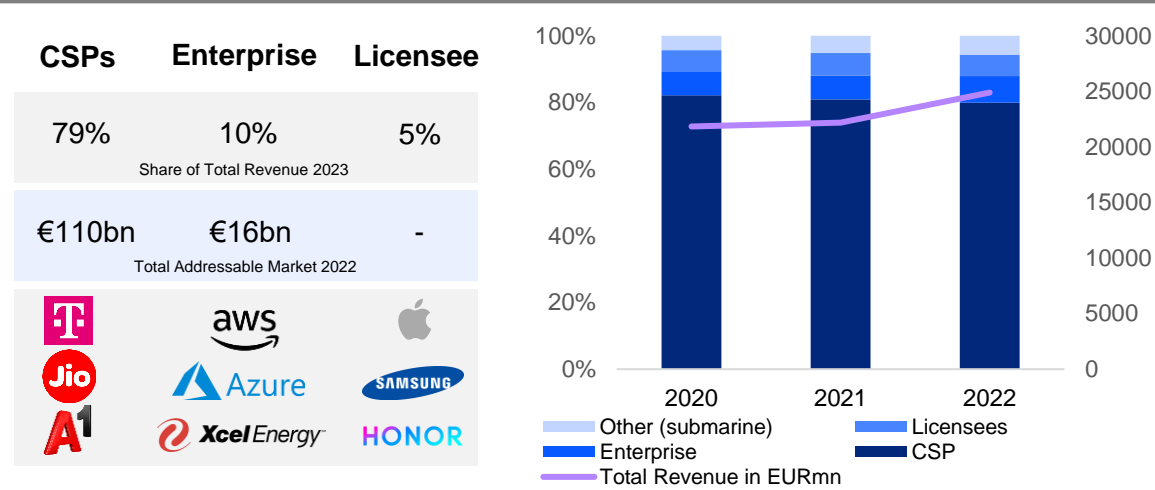
Nokia's business groups reliably capture the vast TAM of the telecommunication industry



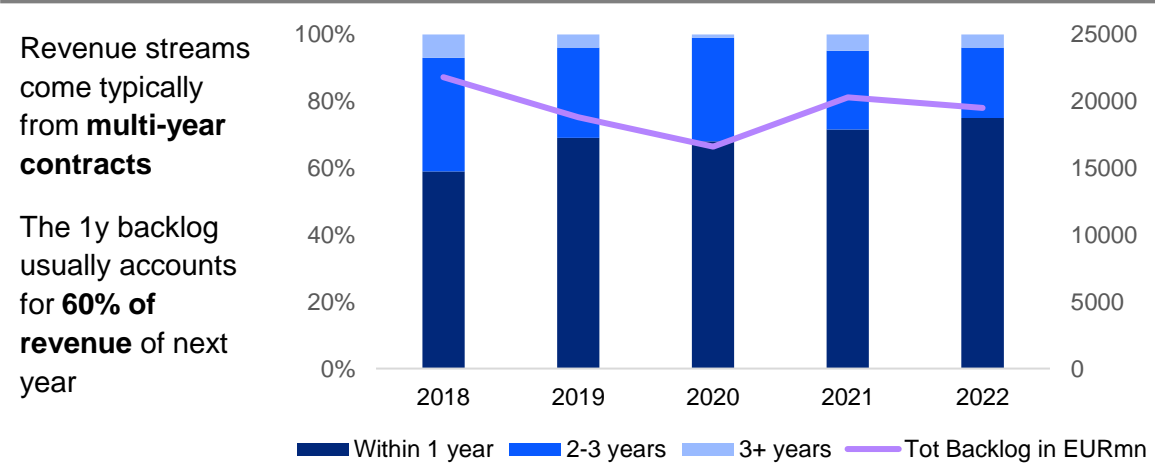
# Business Model II

Solid contractual ties with customers and diversified supply chain make Nokia operationally robust

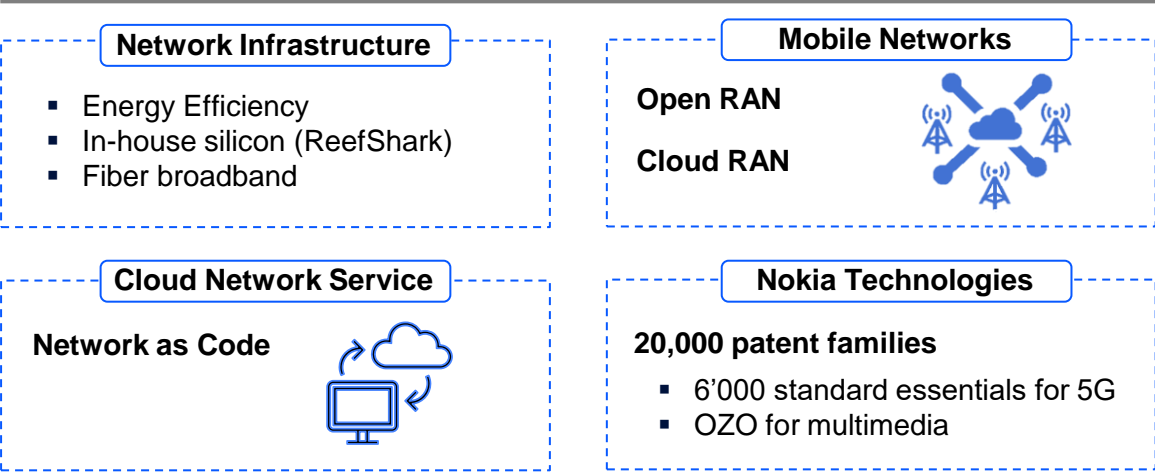
## Customers and Revenue Streams



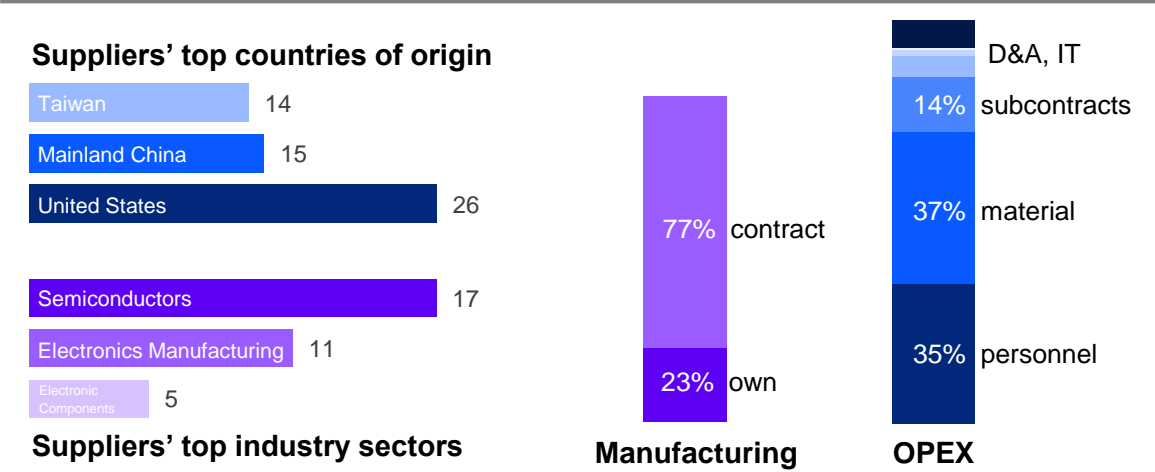
## Order Backlog Development



## Unique Value Proposition



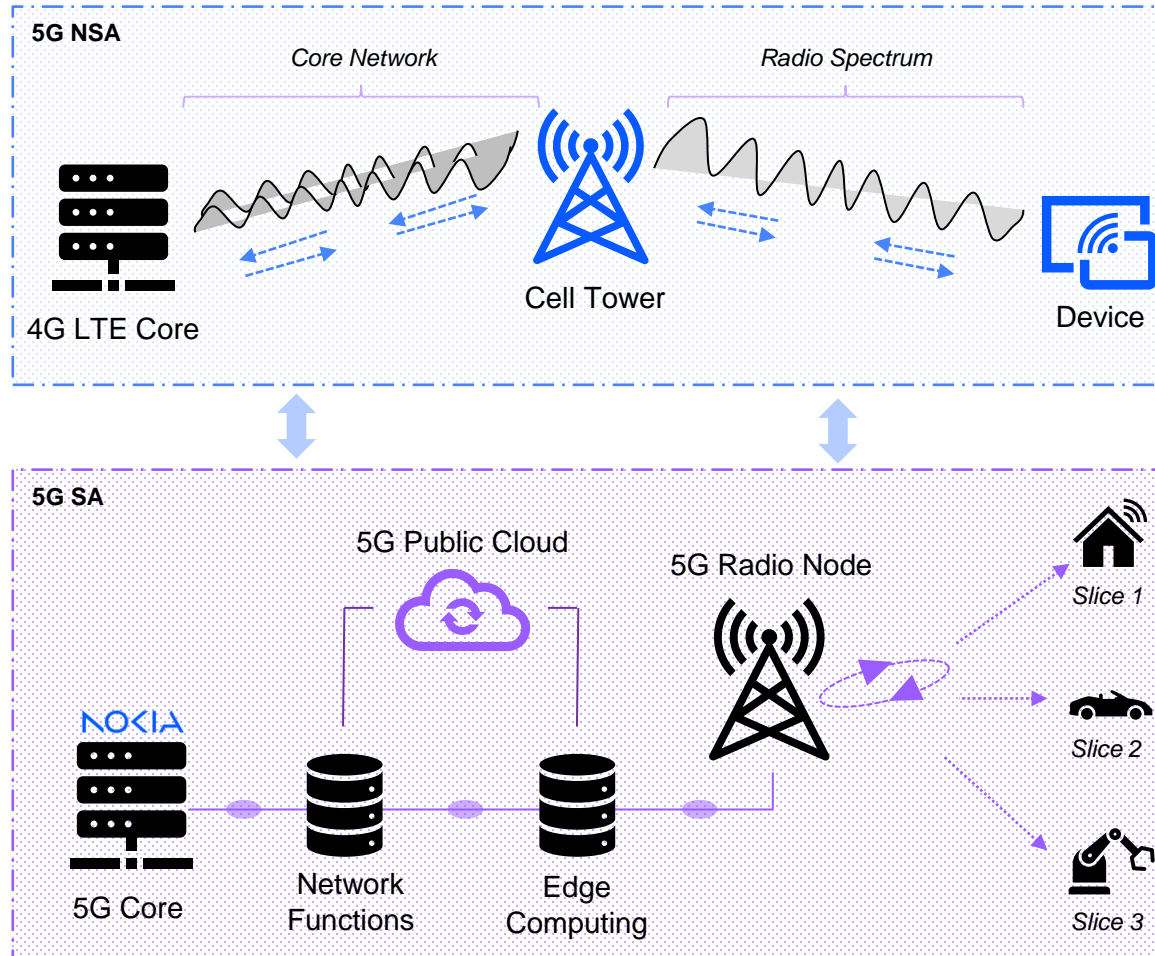
## Supply Chain and Cost Structure



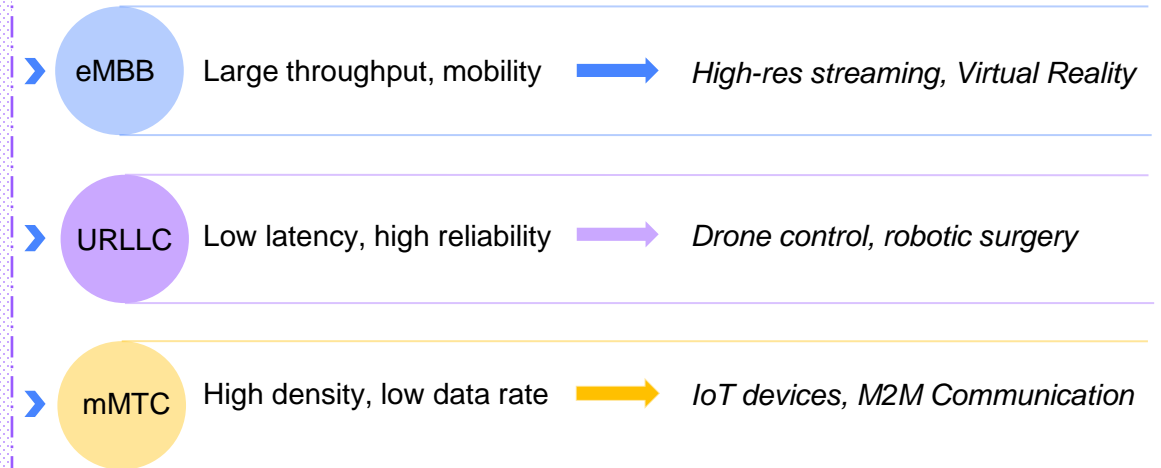
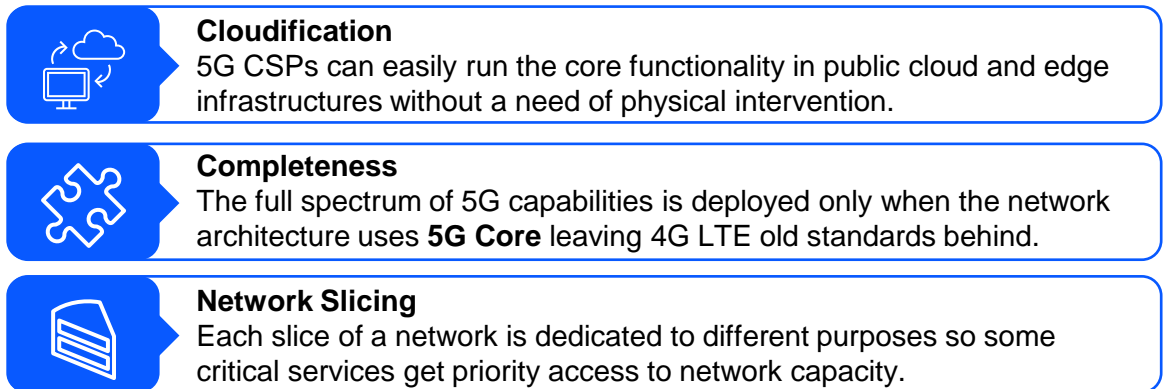
# 5G Standalone Leadership

Nokia is at the forefront of freeing network innovation by providing 5G Standalone services to its CSPs

## 5G Network Types



## Nokia's 5G SA Benefits

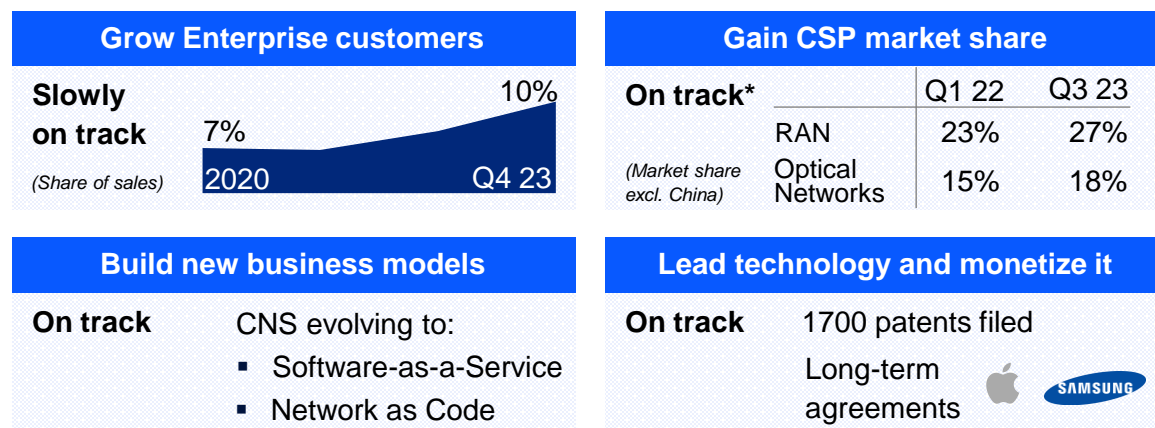




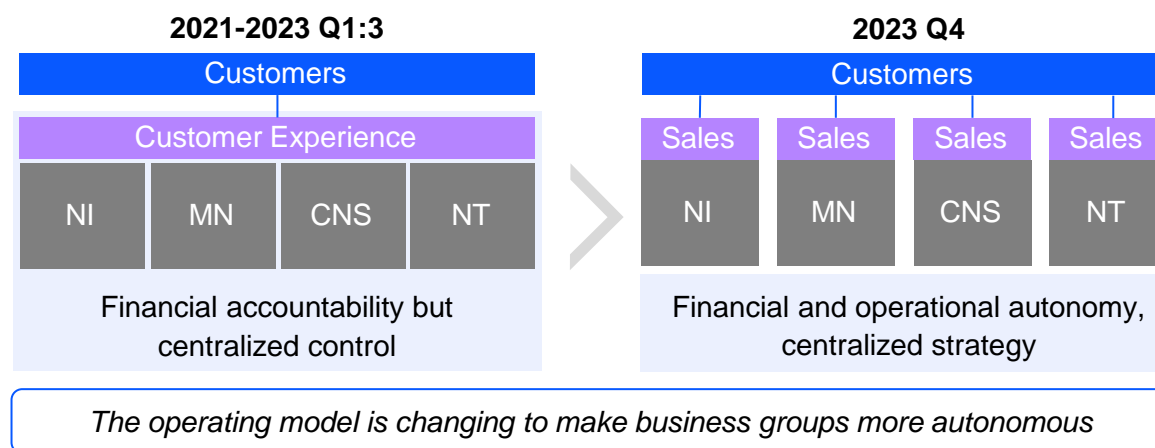
# Business Model III

Implementing cost cutting right on time while diversifying the customer base and optimizing internal processes

## Long-term Strategy and Execution



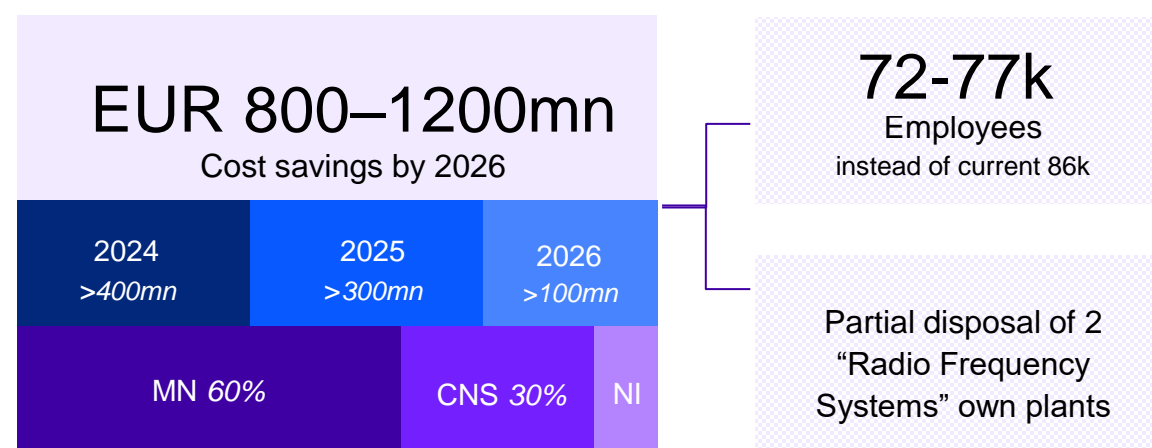
## Restructuring



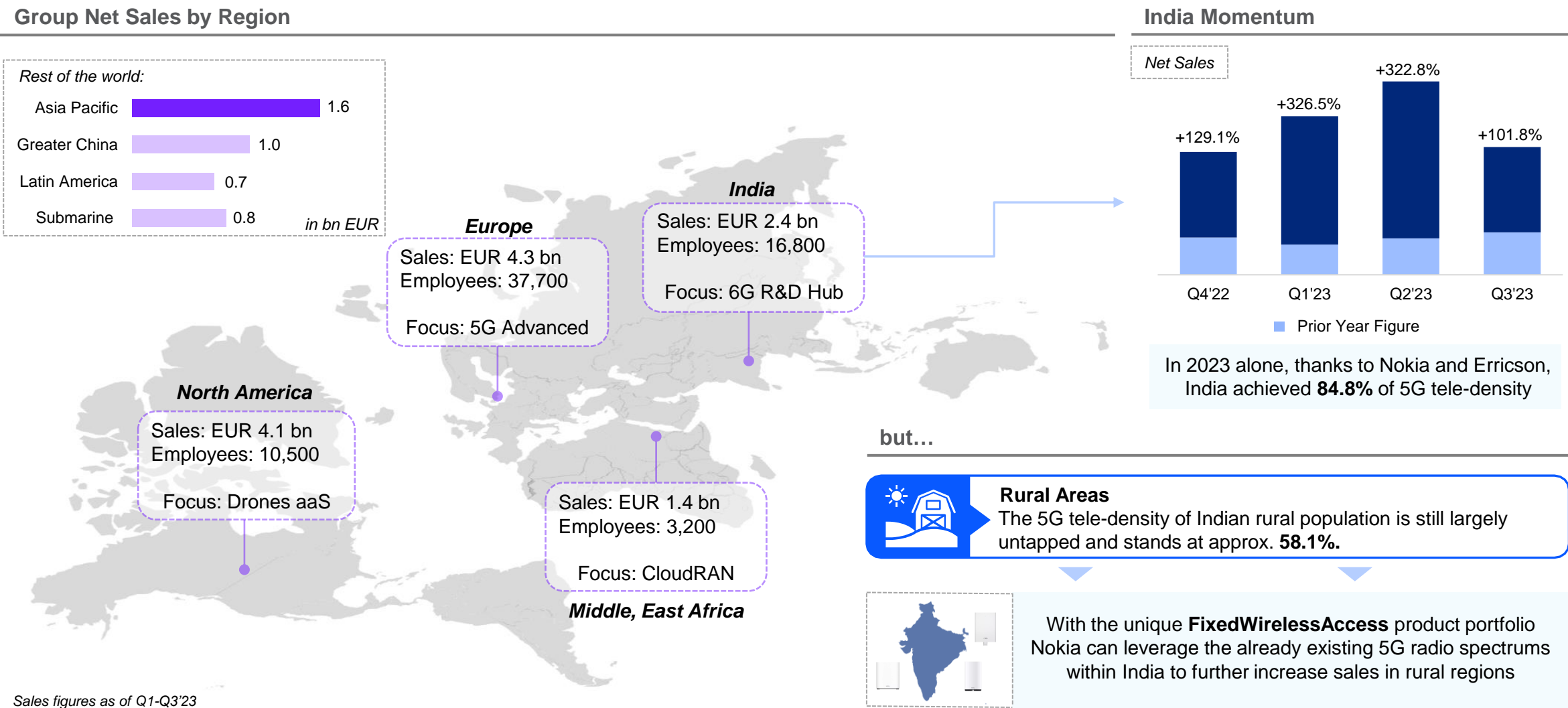
## Acquisition Milestones

| Acquisition                                    | Rationale  |
|--|--|
| <b>Nokia Siemens Networks</b> (2013)<br>€1.7bn | <ul style="list-style-type: none"> <li>Started as joint venture with Siemens Communications</li> <li>Hardware expertise on mobile broadband equipment</li> </ul> |
| <b>Alcatel-Lucent</b> (2015)<br>€15.6bn        | <ul style="list-style-type: none"> <li>Gain Bell Labs' R&amp;D expertise and patents portfolio</li> <li>Expand Nokia's addressable market by 50%</li> </ul>      |
| <b>Unium</b> (2018)                            | <ul style="list-style-type: none"> <li>Intelligent Wi-Fi mesh</li> </ul>   |
| <b>Elenion</b> (2020)                          | <ul style="list-style-type: none"> <li>Optical connectivity</li> </ul>   |

## Cost-cutting



Unprecedented 5G growth in India spurs further Nokia’s market potential in untapped rural areas



A futuristic server room with blue lighting and hexagonal ceiling lights.

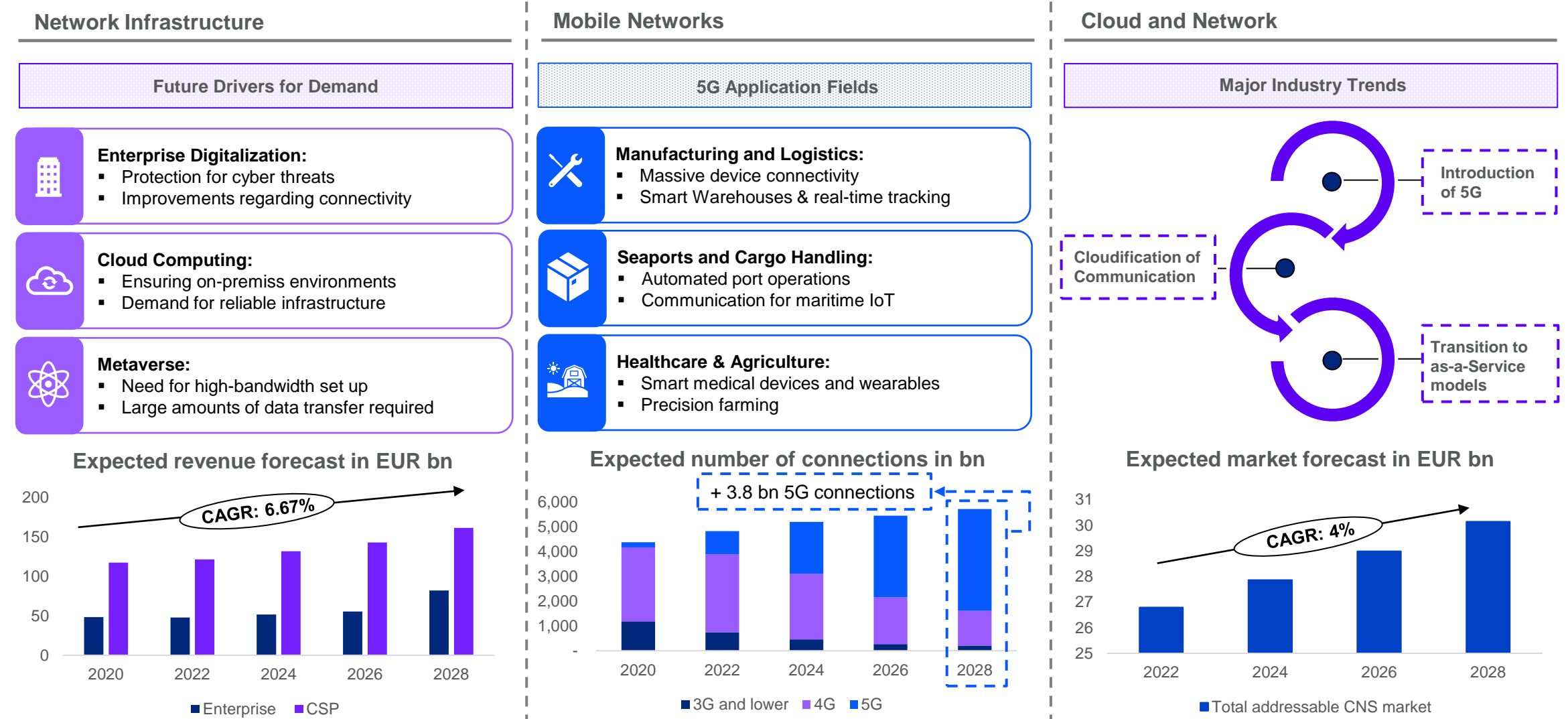
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**Market and Industry Overview**



# Market Overview

The market analysis reveals encouraging developments and trends across all sectors

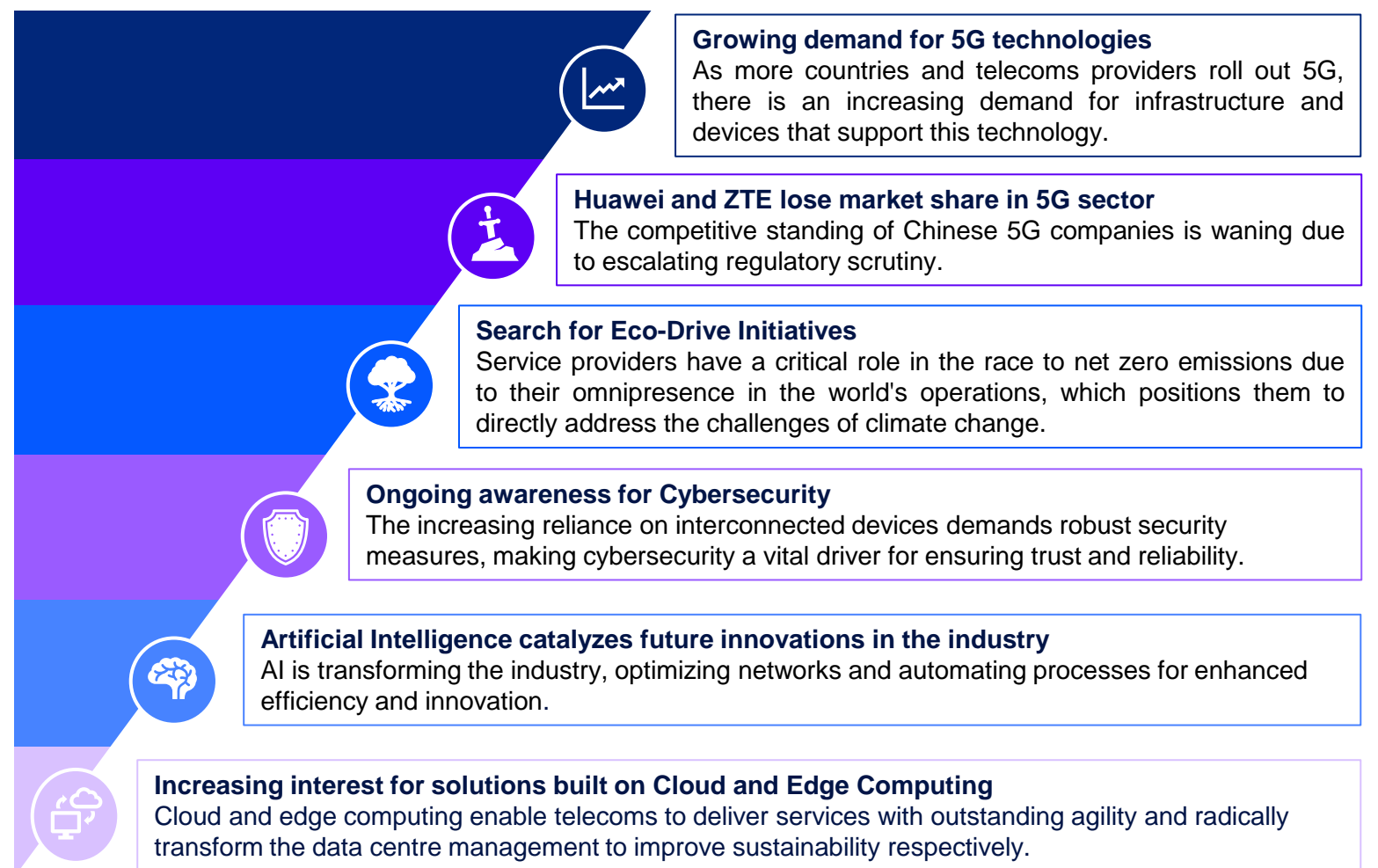




# Trends and Market Drivers

Nokia's market momentum is propelled by the trends of Industry 4.0 and sustainability

## Drivers



## Carbon Footprint

- **93%** of mobile radio network product life cycle emissions occur whilst in use
- 5G can potentially provide **100 times more** data traffic with less energy per bit
- Network Optimization has the potential to **decrease** energy consumption of clients **by almost 14%**

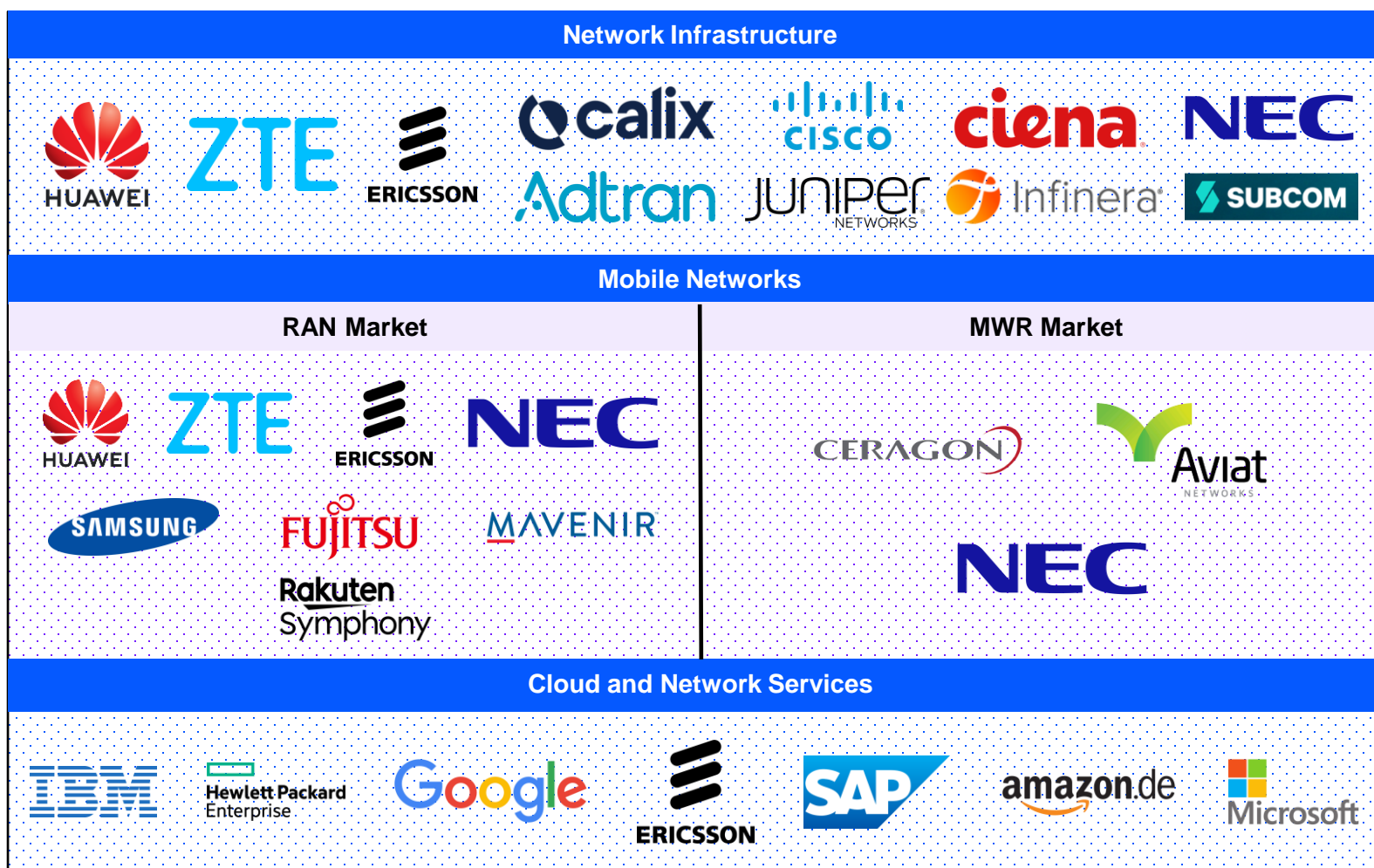
## Artificial Intelligence

- Transforming CX**
  - 59% reduction of video buffering
  - 97% early detection of network issues
- Operational Efficiency**
  - Lower cost of ownership
  - 85% decrease in field dispatches
- Business Innovation**
  - AI-powered applications create new revenue streams

# Competitors Overview

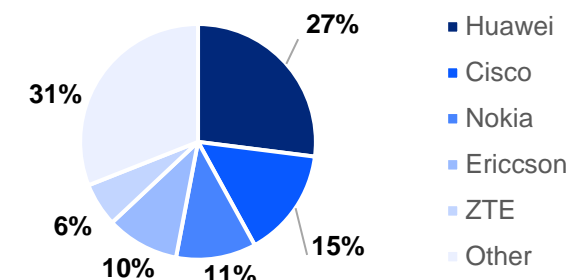
Nokia's extensive array of operations gives rise to significant competition

## Competitors



## Analysis

Market Share Network Infrastructure



### Ericsson:

- Deal with 16 of world's 20 largest communications service providers
- USD 14 bn deal with AT&T in RAN segment

### ZTE:

- built of 5G demonstration networks in Spain, Austria, Australia and Italy are threatened by the current planned ban

### Largest Cloud Players (Hyperscalers):

- Alphabet (Google Cloud Platform)
- Amazon (Amazon Web Services)
- Microsoft (Azure)

# Competitor Analysis: Ericsson and ZTE

Nokia strategically fills the gaps in its competitors' portfolio offerings

## Ericsson



### Overview:

- One of the leaders in Mobile Network Solution in RAN market
- Headquarters: Stockholm, Sweden



### Focused expansion into Enterprises:

- Wireless networks -> Pre-packed solutions
- Communication platforms -> Global network platform



### Position in 5G industry:

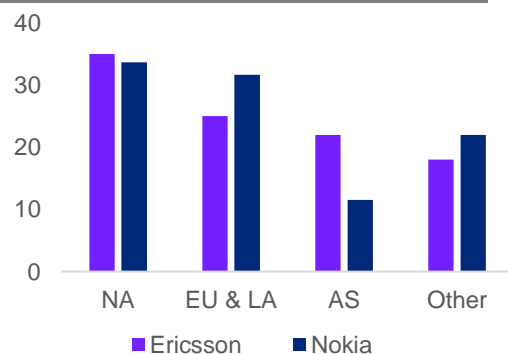
- At year-end 2022, 141 out of the 228 live 5G networks powered
- Sales increased by 7% driven by increased 5G volumes in India



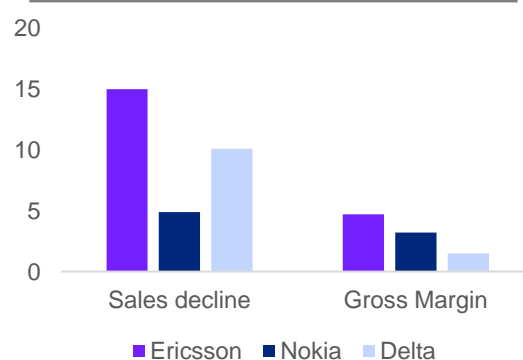
### Company related issues:

- Leak exposes Ericsson's secret dealings with ISIS in 2019
- Ericsson suffers more from market meltdown than Nokia

Sales Split by Market Area in %



MN 2023 YoY Change in %



## ZTE



### Overview

- Strong competitor in Network Infrastructure
- Headquarters: Shenzhen, China



### Current growth segments:

- Server and storage
- 5G industry applications
- Automobile electronics
- Digital energy & smart home



### Position in network infrastructure industry:

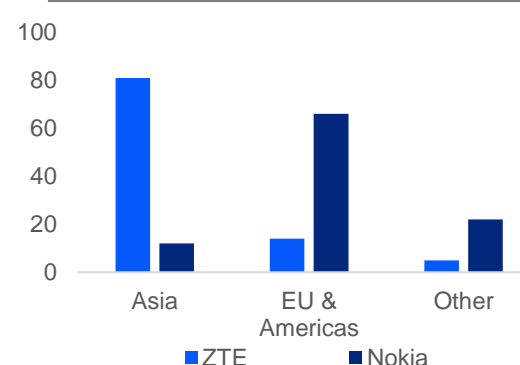
- Domestic market: optical networks, construction of 5G base stations
- Outside China: fibreisation of fixed-line networks



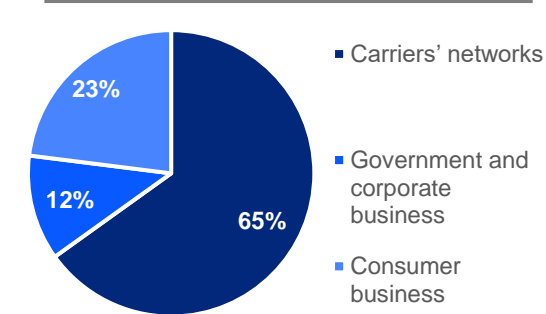
### Company related issues:

- ZTE's classification as a high-risk supplier in the EU, among other countries, significantly restricts the company's operations

Sales Split by Market Area in %



Sales Split by Segment in %





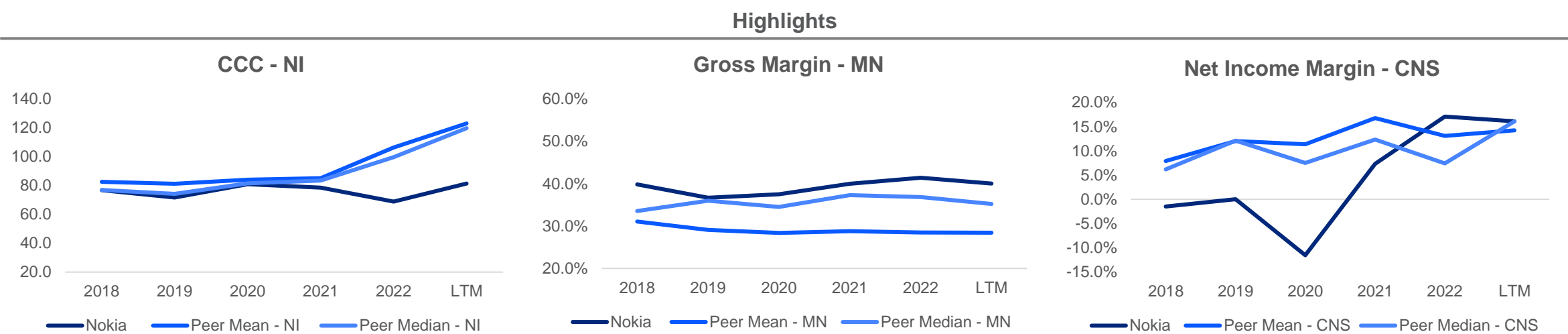
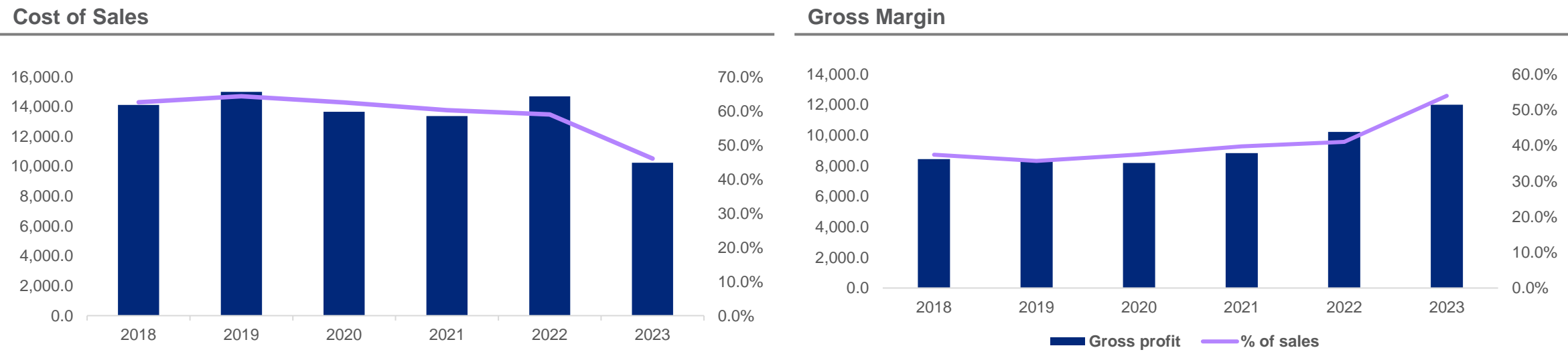


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**Peer Benchmarking**

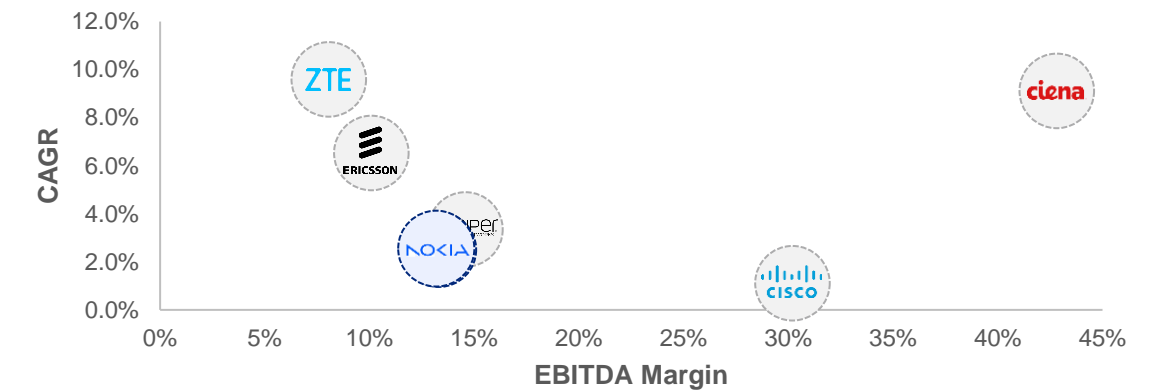


Nokia starts gaining momentum after major changes in business structure

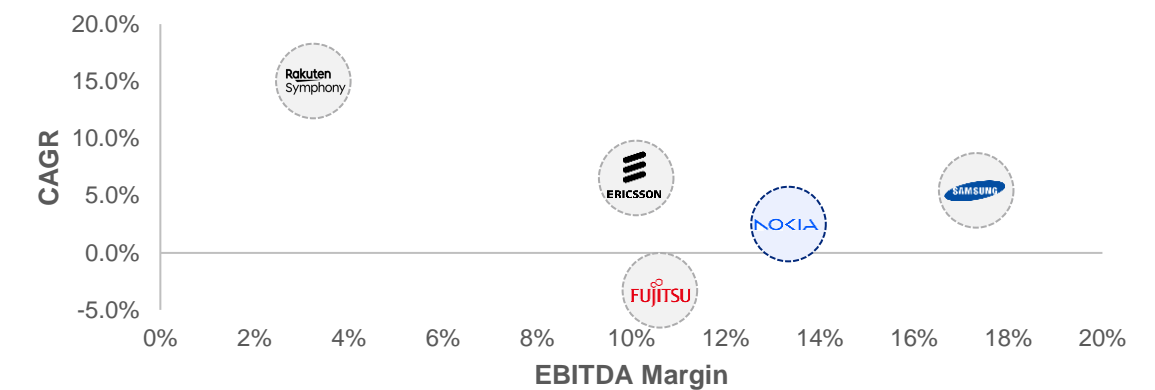


Nokia shows sustained strength in NI and MN with growing embrace of CNS

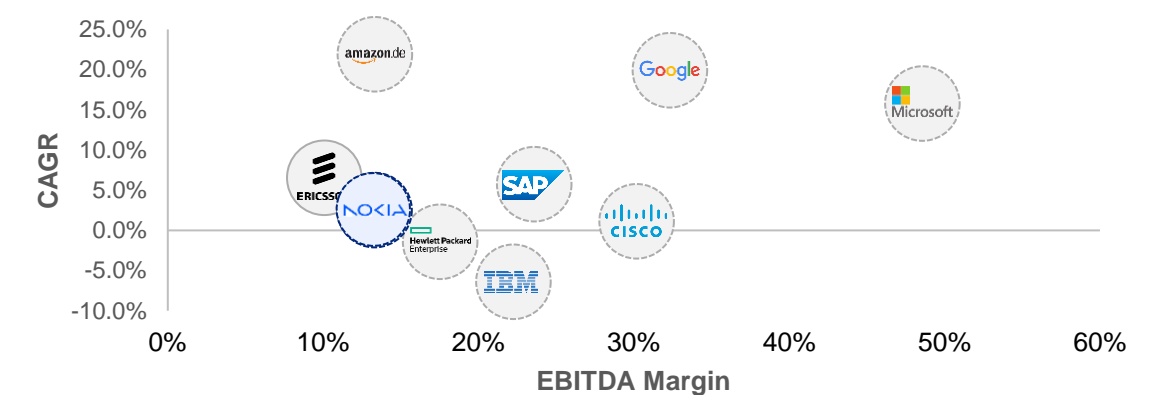
## Network Infrastructure



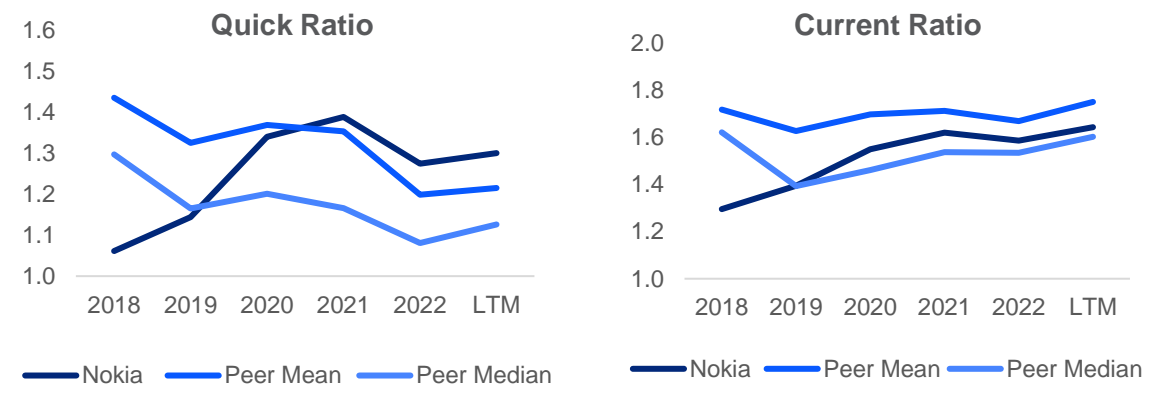
## Mobile Network



## Cloud and Network Services



## Liquidity Ratios





# **Nokia Corporation**

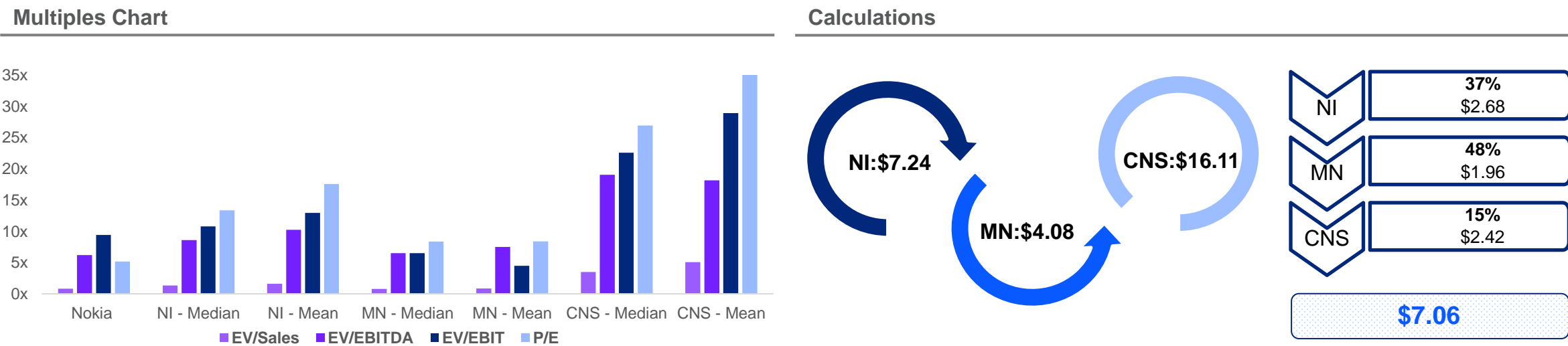
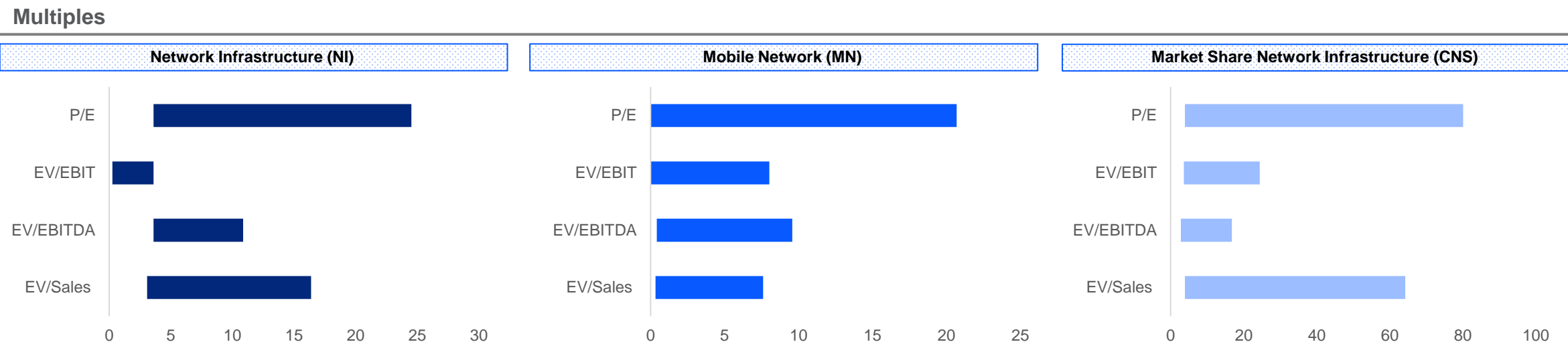
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## **Valuation**



# Valuation I – Multiples

Multiples benchmarking shows Nokia being undervalued in a complex peer environment





# Valuation II – Discounted Cashflows

The level of current demand, shift to high-growth segments, and costs savings determine the intrinsic value of Nokia

## Main Drivers



### Demand for current solutions

Nokia's revenue is mainly driven by the demand of their solutions like fixed networks, 5G RAN and current patents mostly sold to CSPs.



### Shift to high-growth segments

In the medium term, Nokia will shift stronger towards private wireless networks, SaaS, NaC, and enterprise sales.



### Cost savings

The current cost-saving plans will strongly influence their profitability. The effect depends on the timing and magnitude of the savings.

## DCF Assumptions

DCF Assumptions



WACC: 10.0%



Beta: 0.9



LT GR: 1.5%



D/E: 3%



### Bear Case

Lower growth of current solutions, a slower shift as well as smaller and delayed cost savings.



### Base Case

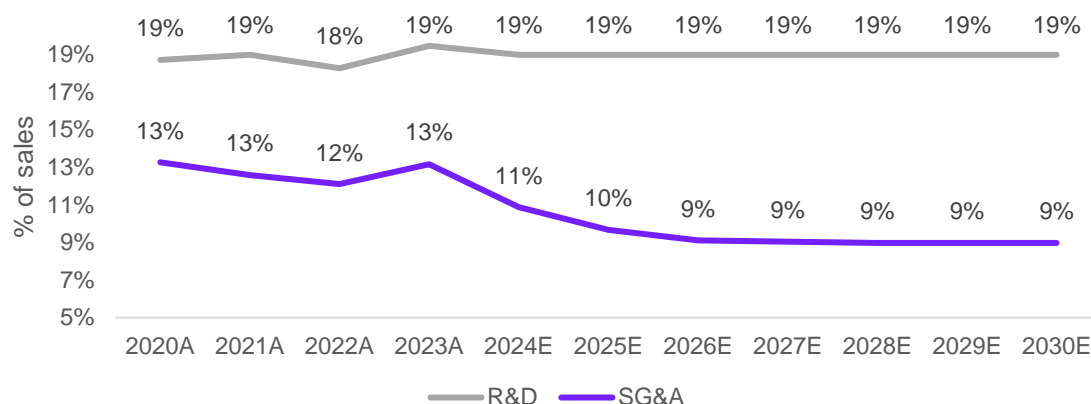
Growth and cost savings as expected by management and in line with market expectations.



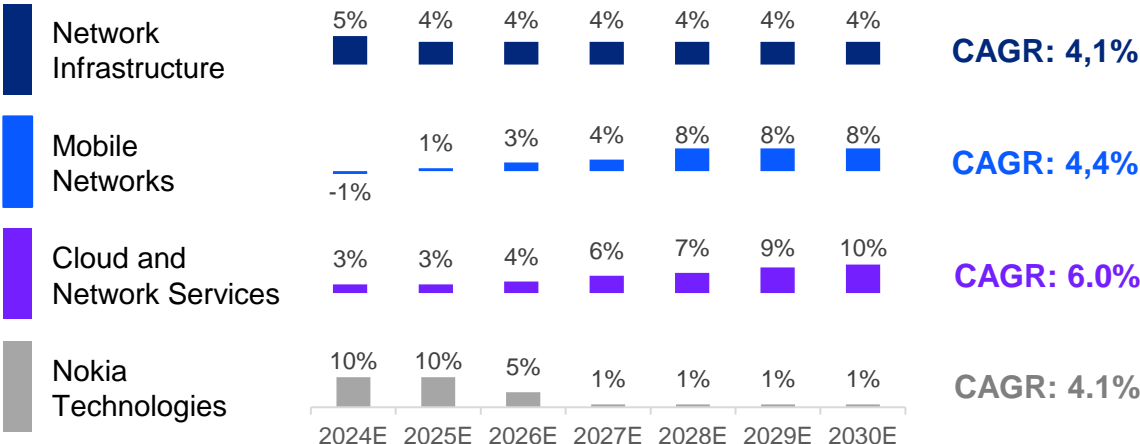
### Bull Case

Faster shift towards high-growth segments and more effective cost-reduction activities than initially planned.

## Effect of Cost Savings



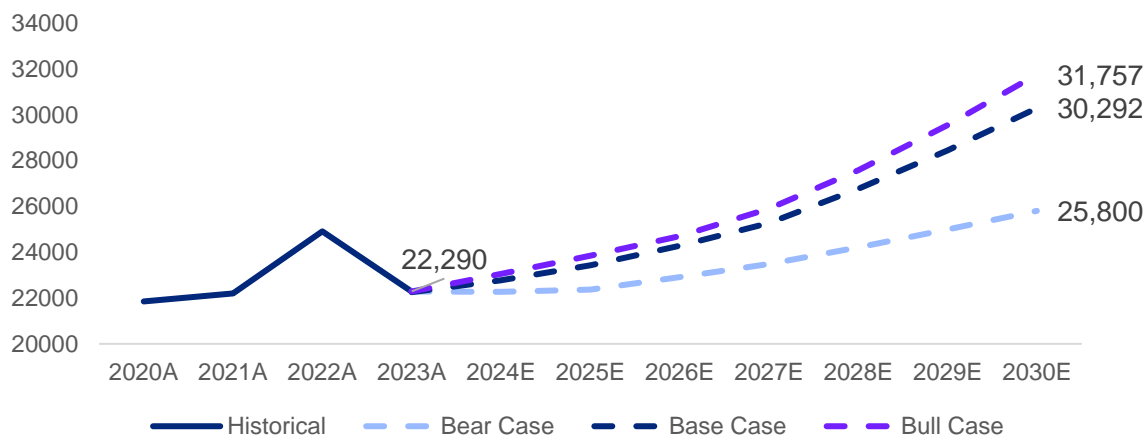
## Growth Rates per Business Group



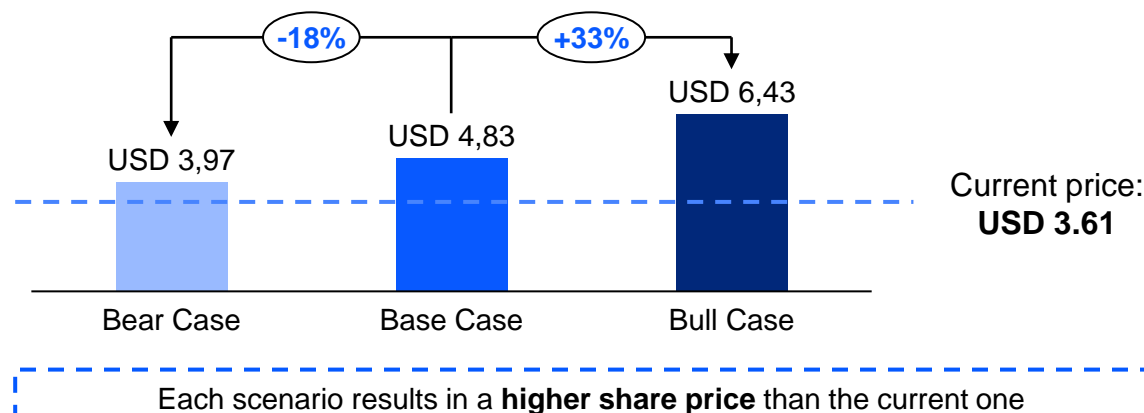
# Valuation III – Valuation Summary

When weighing all qualitative and quantitative aspects, one arrives at a convincingly bullish outlook for Nokia

## Revenue Growth in EUR mn



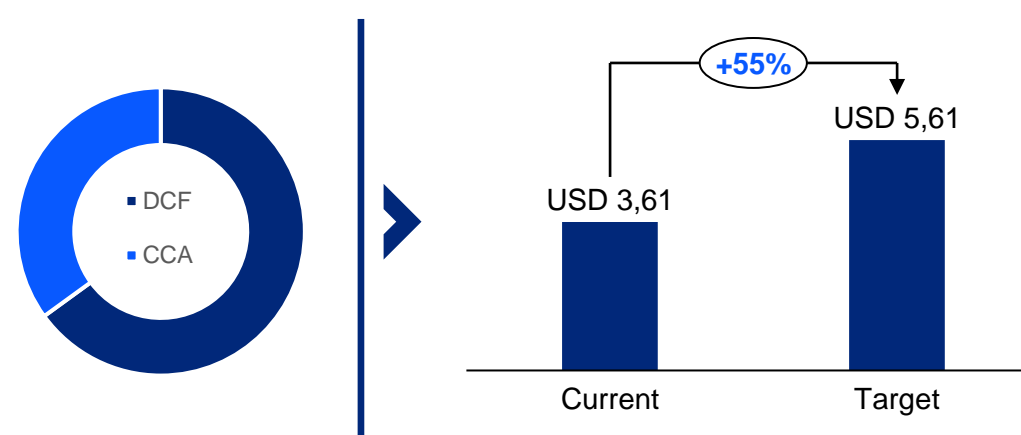
## DCF Share Price Range



## Sensitivity Analysis

|             |       | WACC   |        |        |        |        |
|-------------|-------|--------|--------|--------|--------|--------|
|             |       | 8.82%  | 9.82%  | 10.82% | 11.82% | 12.82% |
| Growth Rate | 1.00% | \$6.11 | \$5.32 | \$4.69 | \$4.18 | \$3.76 |
|             | 1.25% | \$6.24 | \$5.41 | \$4.76 | \$4.23 | \$3.80 |
|             | 1.50% | \$6.38 | \$5.51 | \$4.83 | \$4.29 | \$3.84 |
|             | 1.75% | \$6.52 | \$5.62 | \$4.91 | \$4.35 | \$3.88 |
|             | 2.00% | \$6.68 | \$5.73 | \$4.99 | \$4.41 | \$3.93 |

## Target Share Price





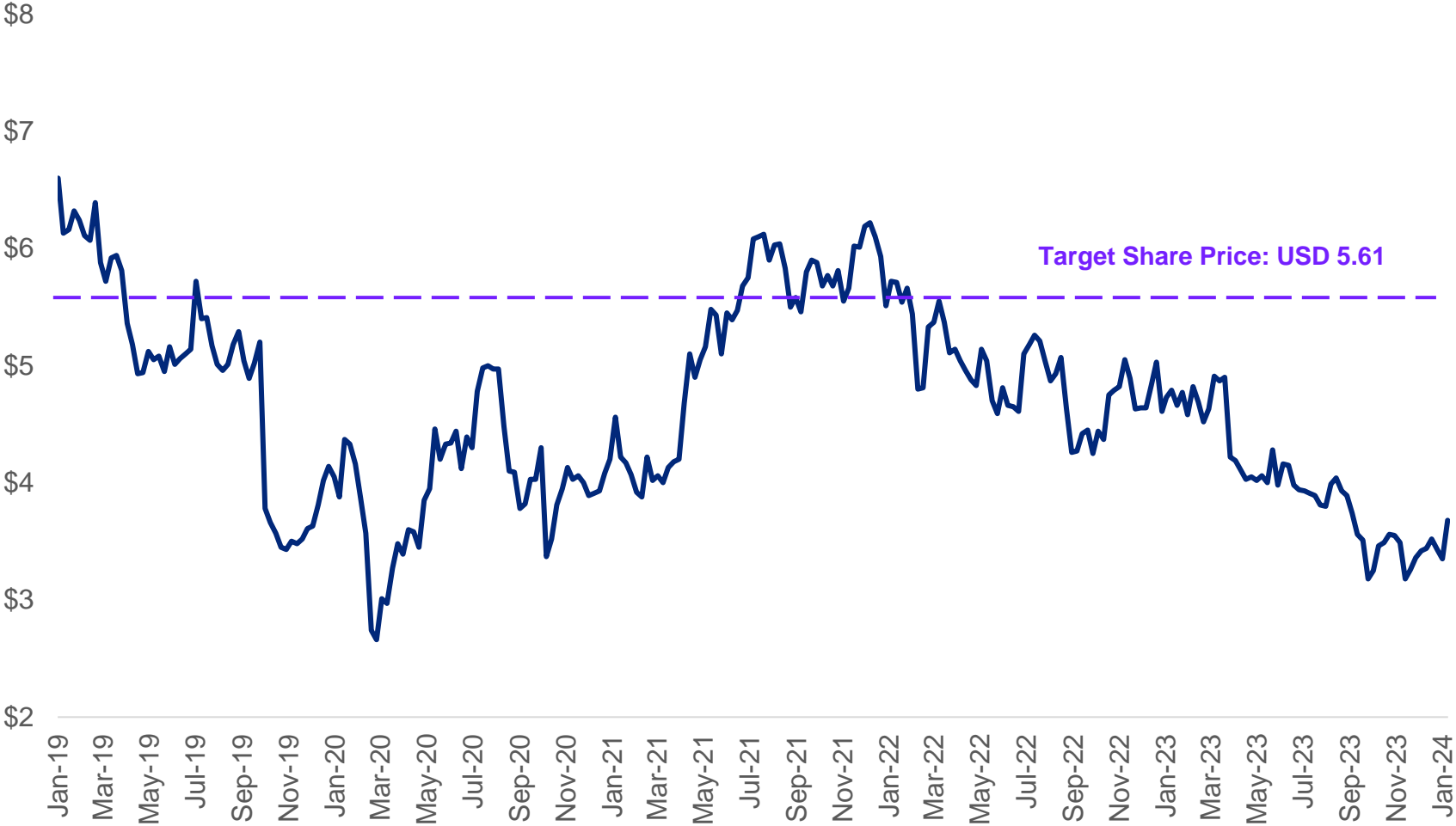
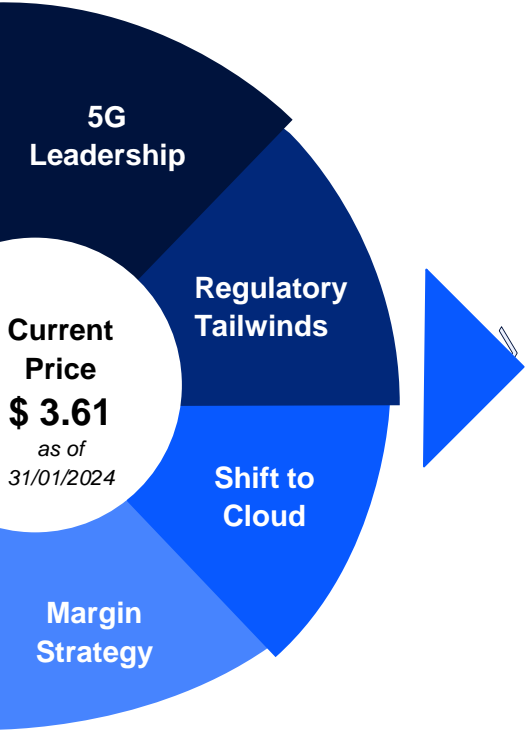
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**Conclusion**



# Conclusion

Nokia’s courageous turnaround paves the way for becoming the number one player once more



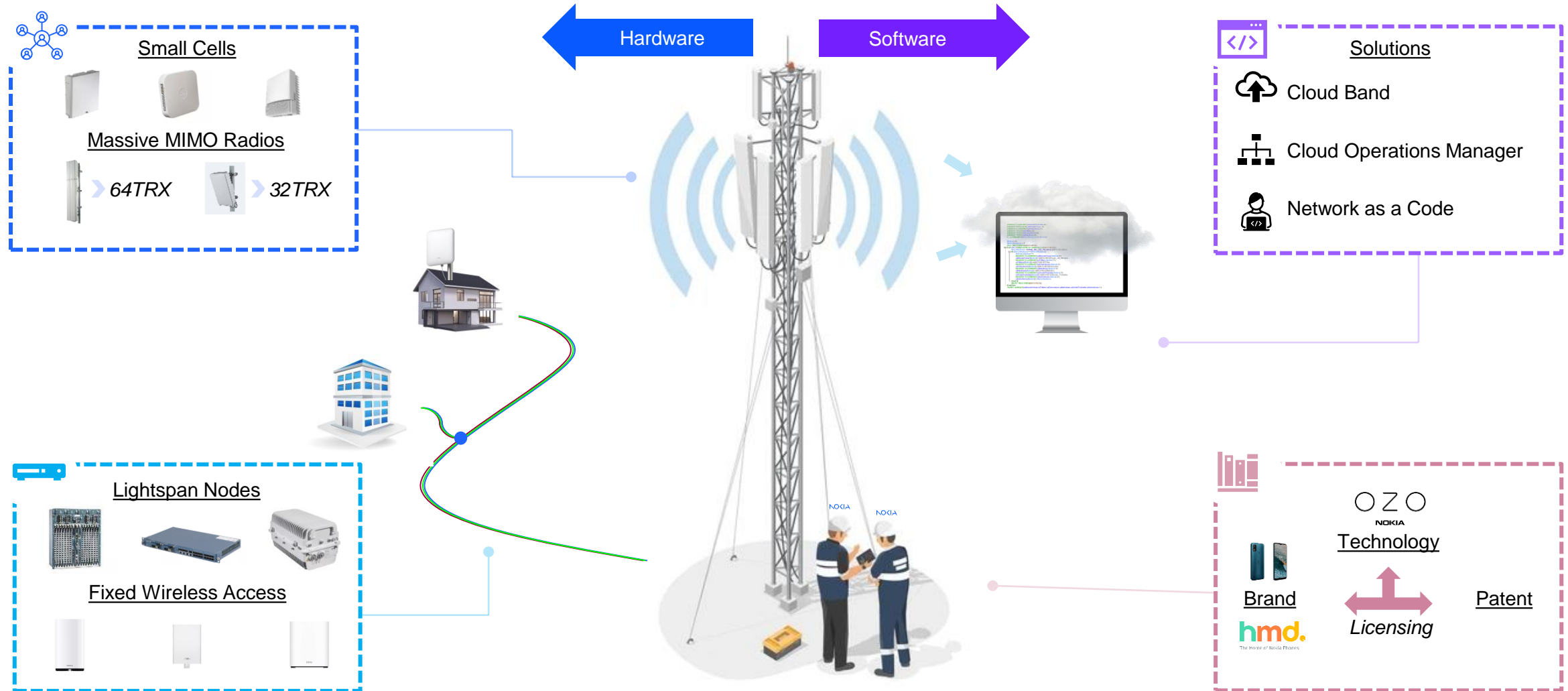


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**Appendix**

# Appendix: Nokia Ecosystem

Nokia fosters 5G advancement across all verticals by offering innovative hardware as well as software solutions

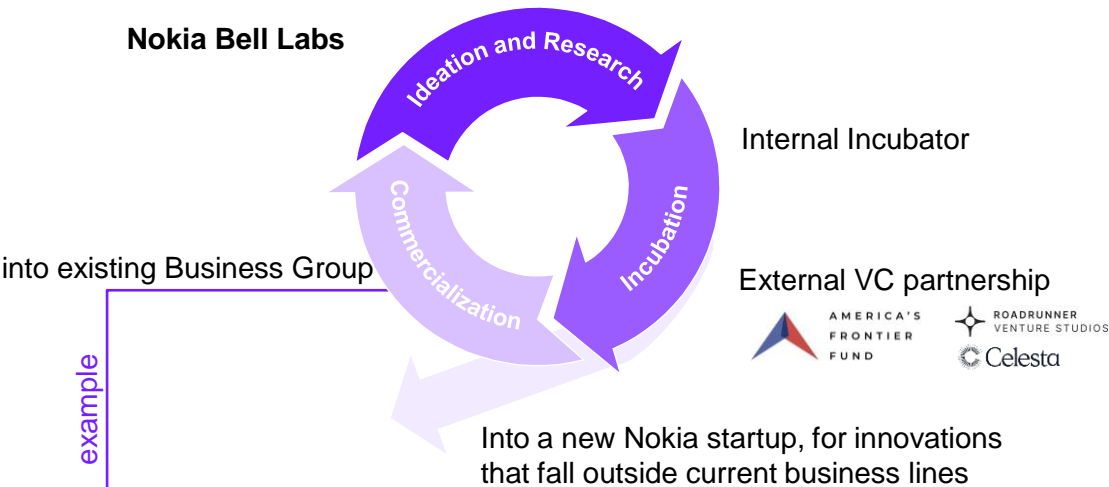




# Appendix: Nokia R&D and Innovation

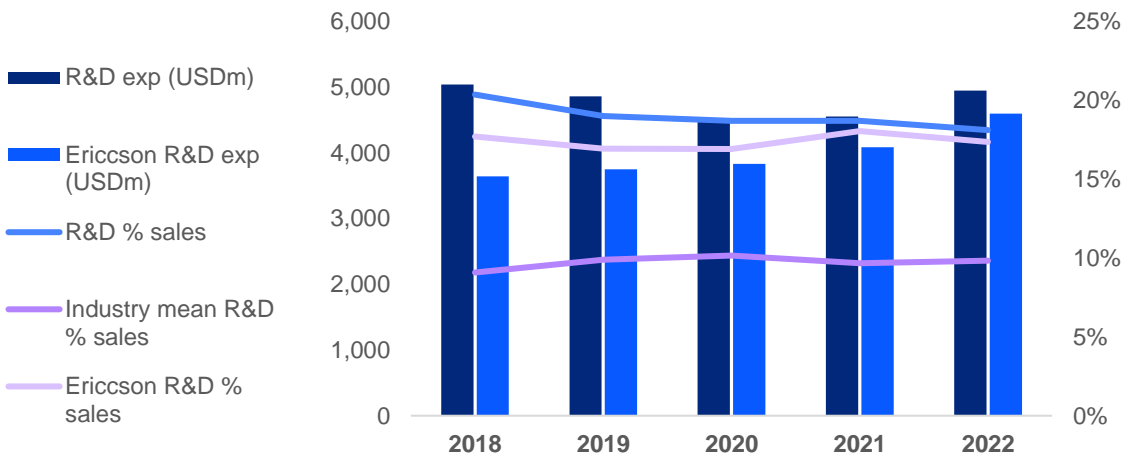
Innovation is expensive to fuel but also the main competitive advantage

## Nokia's innovation flywheel...



| Open RAN   | Decoupling radio access hardware from core network software, allowing for <b>interoperability</b> of equipment from different vendors  |
|--|--|
| The concept  |  |
| ReefShark  | Network as Code  |
| The hardware   | The software   |
| Nokia's own SoC to manage 5G stations. <ul style="list-style-type: none"><li>▪ <b>Open architecture:</b> interoperability and modularity (add capacity with plug-in)</li><li>▪ <b>Programmability:</b> dynamic control and optimization of network</li></ul> | A form of SDN, decouples control plane (manages network traffic) from data plane (creates and sends data packets). <ul style="list-style-type: none"><li>▪ <b>Control plane</b> to be programmed and centrally controlled separately</li></ul> |

## ... keeps R&D above competitors



## Patent wars

|                            |   |
|----------------------------|---|
| Standard Essential Patents | SEP must be used to comply with technical standards. Standard-setting bodies require their members to agree to license their SEP on fair, reasonable and non-discriminatory terms<br><br>Nokia owns <b>6000 SEP for 5G alone</b> , many more for general connectivity |
| Ongoing litigations        | <div><div></div><div></div><div>1st in China<br/>2nd globally</div></div> <div>Nokia had its SEP <b>confirmed as infringed</b> in: Brazil, Germany, Netherlands, UK</div>   |

# Appendix: „Revolutionizing Industries“

## Revolutionizing manufacturing with telecommunications

### Industry 4.0 in the Telecom Industry

Industry 4.0 enables the **combination of the digital, physical and virtual worlds** to facilitate growth opportunities and reframe the current productivity through new service models and smart product options.

With production systems forecasted to become **35% faster and 30% more efficient** in the future, the Industry 4.0 will be paving way to the concept of **mass customization** on the unseen before scale. **Telecom industry** is posed to encourage this development by contributing the necessary level of **connectivity**.



#### Network Virtualization and Software-defined Networking (SDN)

Network virtualization and SDN adoption facilitate more agile, scalable, and automated network operations, aiding in optimization network resources, enhance network flexibility and efficiency.



#### Data Analytics and AI-driven Insights

The AI-driven data analytics of the accrued data from connected devices and processes, could provide actionable intelligence for business decisions



#### Enhanced Customer Experience

Ameliorating customer experience through the involvement of AI-powered chatbots, self-service portals, personalized offerings, and seamless omnichannel interactions.



#### Cybersecurity

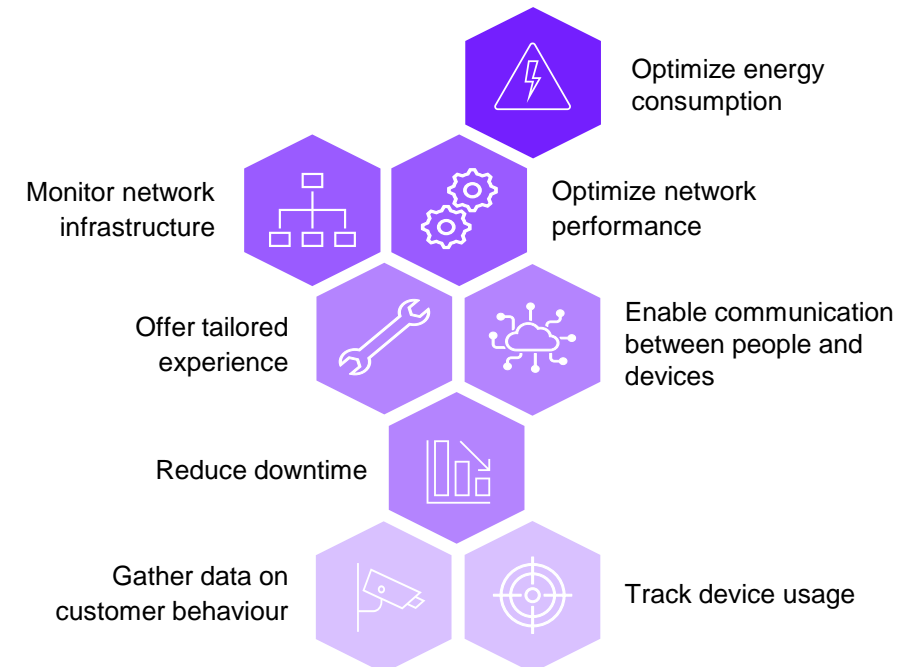
The improvement of cybersecurity to safeguard their networks, services, and customer data from potential cyber threats.

### Internet of Things (IoT)

The IoT is a **network of devices, vehicles**, and other objects **embedded with sensors** and software that enables them to **collect and exchange data**.

IoT provides a **bridge between digital and physical worlds** and connects billions of devices across the world, facilitating the development of new business models and fastening **market growth** for the companies.

#### Key Benefits of IoT for Telecom Industry



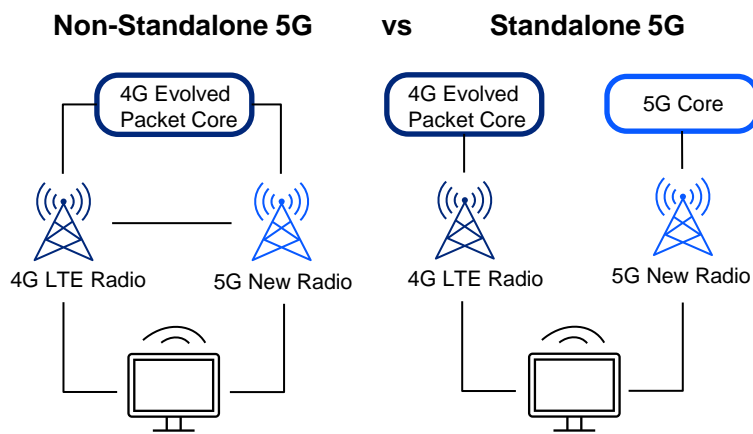


# Appendix: The Past and Future of Cellular Network

## Beyond 5G: Paving the way for a hyperconnected future




### 5G NSA vs 5G SA

|                  |  |
|------------------|--|
| Reduced costs    | Facilitates the <b>building out a 5G network on top of the existing 4G infrastructure</b> instead of investing in a new, costly 5G core. |
| Easy deployment  | NSA networks use the <b>familiar 4G infrastructure</b> , simplifying both the configuration and update processes.                        |
| Fast rollout     | Allows to <b>release an operational 5G network quicker</b> with NSA by <b>using current 4G infrastructure</b> .                          |
| Pathway to SA 5G | The 5G NSA network is configured as <b>a foundation</b> while SA networks is still in development.                                       |

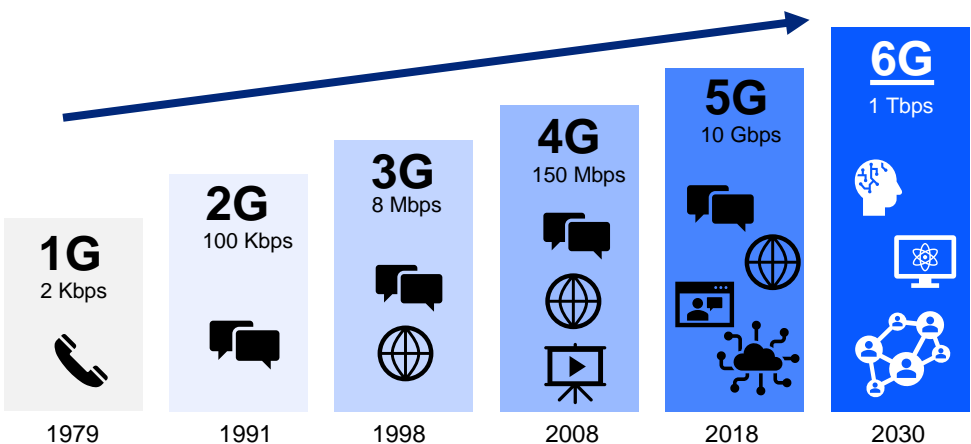


|                          |   |
|--------------------------|---|
| Increased coverage       | Through aggregation of different frequencies 5G SA provides an <b>improved bandwidth</b> , thus, improving a <b>wider coverage</b> .                  |
| Reduced power use        | Because 5G SA doesn't need to operate with 4G LTE, it uses only one method of cellular connectivity and <b>uses less power to support a network</b> . |
| More 5G use case support | Facilitates essential 5G services, such as <b>lower latency and ameliorated bandwidth caps, to power ultrafast, scalable networks</b> .               |
| New services             | The introduction of 5G SA, further encourages the <b>development and adoption of smart factories, network slicing, and etc.</b>                       |

### The 6G Future

-  **Real-time connectivity** between the physical and digital worlds through AI and ML with **digital twins** models and **real time synchronous updates**
-  **Connecting and embedding** a vast array of **smart devices**
-  **Immersive communication** in **augmented and virtual reality**

### Speed Evolution



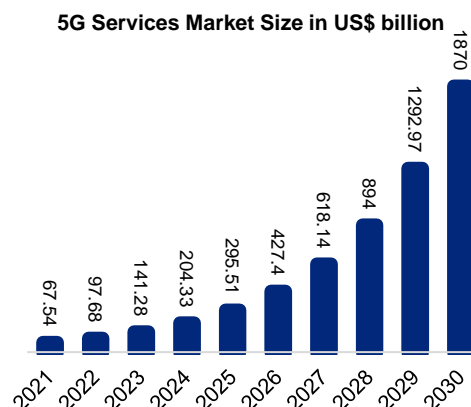
# Appendix: 5G

## 5G fosters innovation and tremendous growth in the B2B segment

### 5G Technology Adaptation Rate

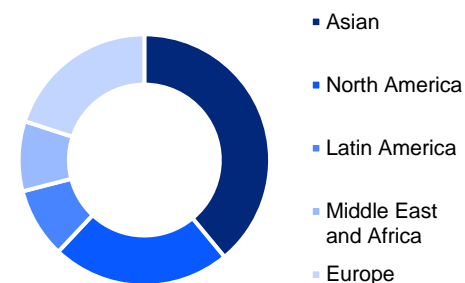
The introduction of 5G technology has a great deal of potential for governments and B2B companies. With a **compound annual growth rate of 34%**, the worldwide **5G B2B industry** is expected to reach **US\$16,8 billion** by 2028 and produce considerable revenues.

Regarding revenue, 5G will mark the first **mobile technology generation** in which **enterprises** will be **more affected** than consumers, as **B2B IoT** is set to play a **crucial role** in the achieving the needed **growth**.



### 5G Geographies

5G Services Market Share, By Region, 2021



**Asian-Pacific region dominates** the 5G services market due to the adoption of the innovative technologies, such as **edge computing and 5G core technology**. While the forecasts expect the **North American region to develop at the fastest rate**.

Top Countries with 5G Coverage Based on the Number of Cities Covered

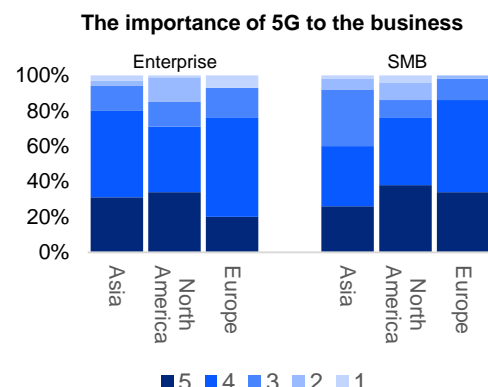


### The Rise of 5G

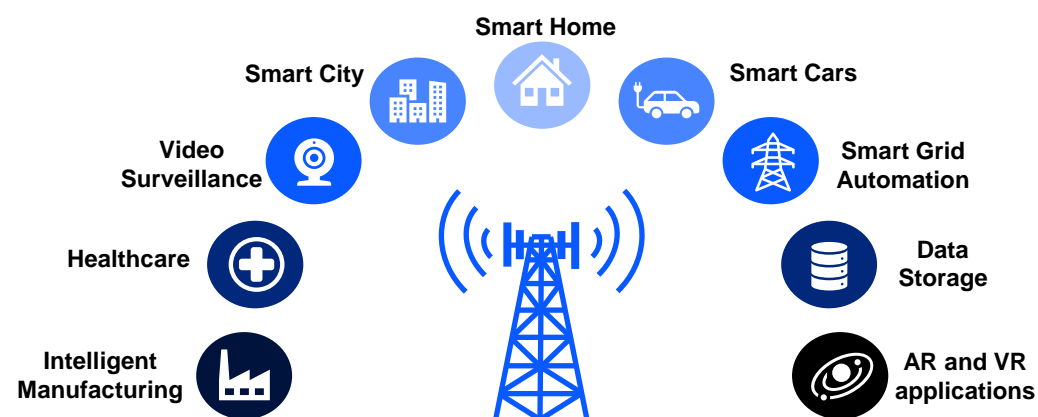
**3** It is forecasted that the number of **5G global subscriptions** will reach **3 billion by 2025**

**236** **5G global subscriptions worldwide** were numbered at **236 million** in 2021.

**683** Total. number of **5G and LTE deployments worldwide**



### 5G Importance



# Appendix: Challenges and Benefits of 5G

The benefits of the 5G deployment outweigh the complexity and cost of infrastructure development

## Challenges

The **high investment cost** into both hardware and software updates defined by the necessity of the developed **infrastructure**.



Belief of many companies into **the sufficiency of the modern technologies**, such as 4G, WiFi, fiber and satellite internet.



The **scarcity of the 5G devices**, of which less than 6.5% are available **for business and industrial use**.



The **limited** and highly regulated **spectrum availability**.



Increased danger of **interferences** due to operating at **higher frequencies**.



The high level of vulnerability to **cyberattacks** compared to previous mobile networks generation.



**Not sufficient 5G coverage** complicates the deployment of 5G in rural locations.



**Vendor lock-in** for telecom operators due to high switching costs and possible disruptions stemming from it.



## Benefits

**Faster connection and more bandwidth of 5G** allow for transmission of large amount of data and at a 10 times faster connection speed compared to 4G.



**Lower latency** facilitates fewer delays, which is going to be crucial for the further development of the IoT.



Greater device capacity will enable for the **scalability and higher efficiency** with potential to support up to 1 million connected devices per one km.



The increase of the **reliability** of the connection fosters growth in the segments of IoT, industrial automation, wireless vehicle coordination.



**5G flexibility** provides more **configuration options** and allows to secure more secure individual frequency bands.



The **decrease in the required computing power** owed to the fewer delays, will favourable affect the device battery life.

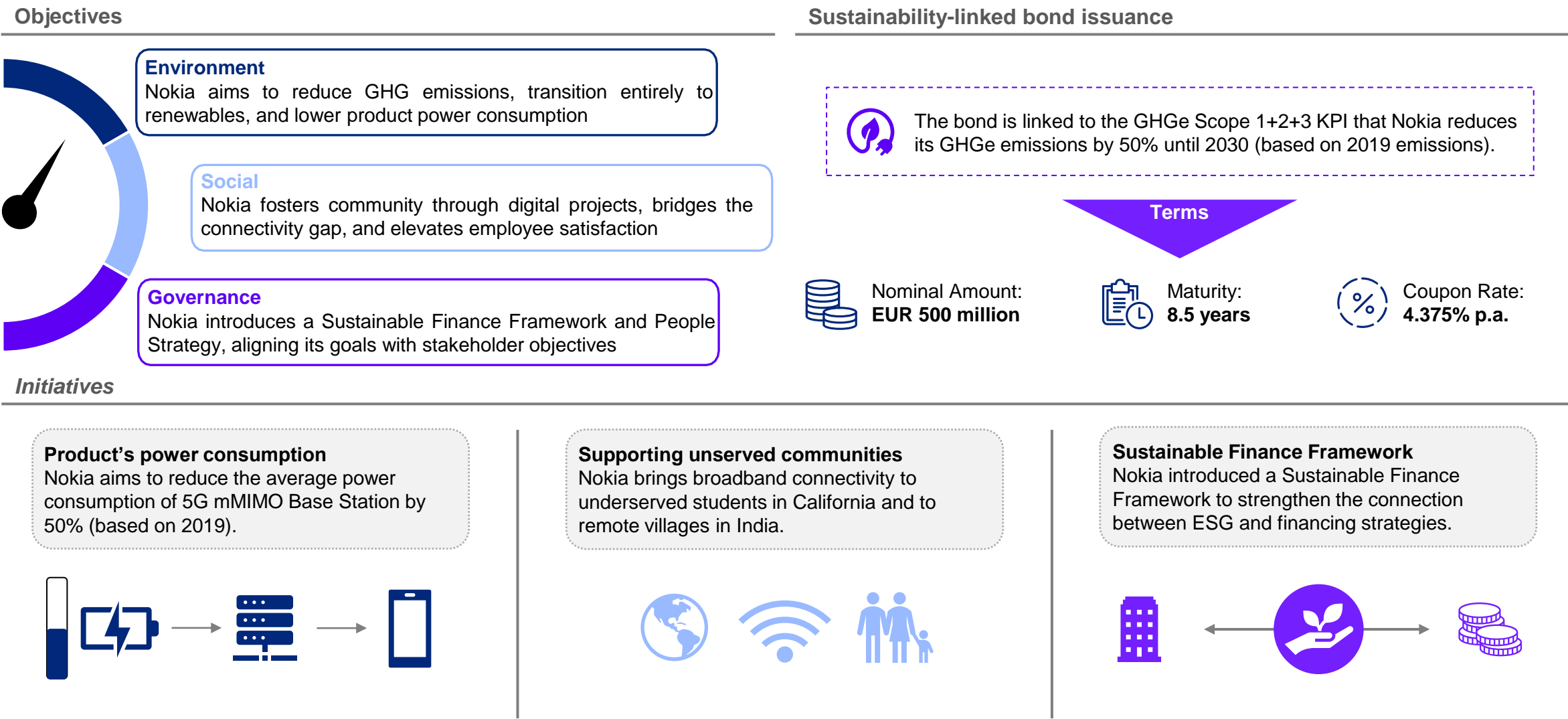


Enabling technologies such as **IoT, AI, and AR/VR** enhances operational efficiency, automate processes, and facilitates new business models.



Fostering of **human and robot collaboration** provides the opportunities for further innovation.





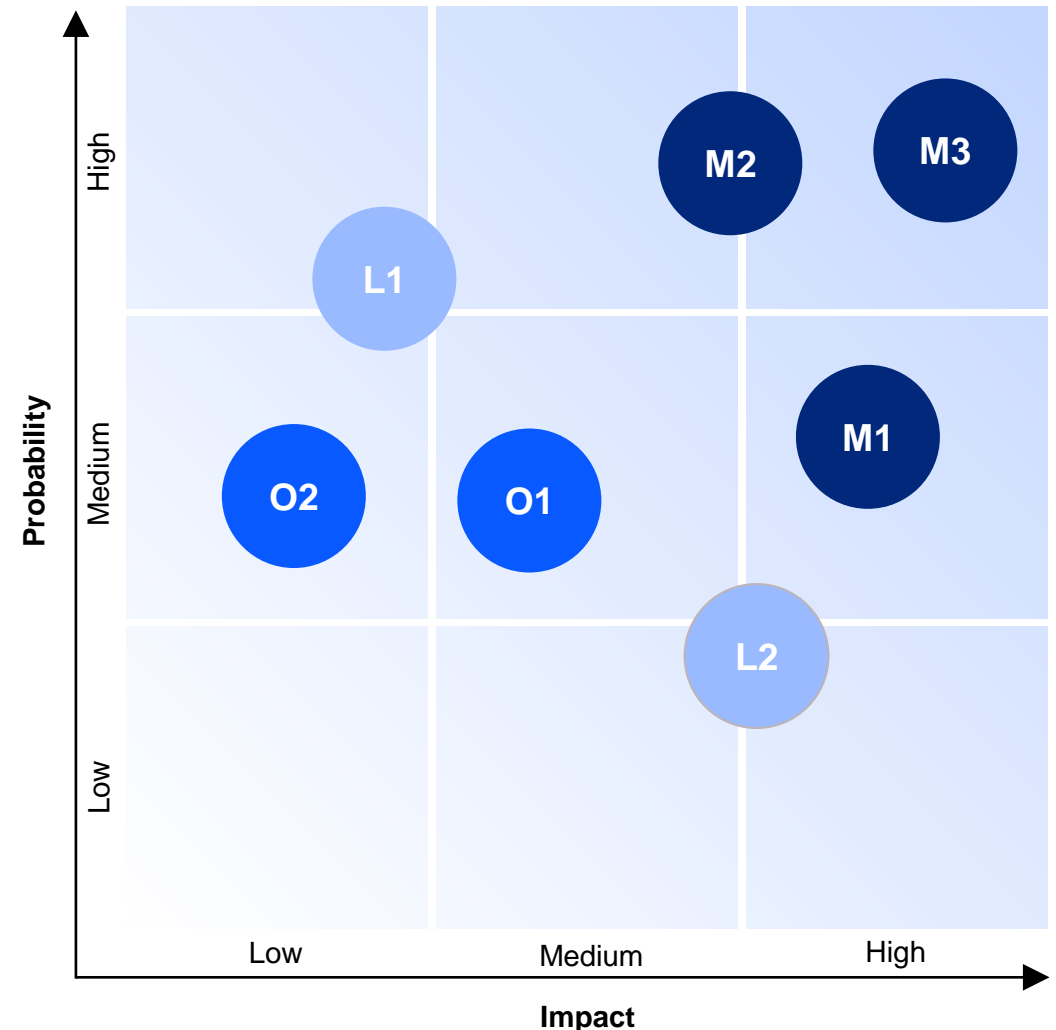


# Appendix: Risks

Staying at the forefront of innovation is Nokia's main challenge











- M1** The **poor strategic choices** during the growth stage of the new **disruptive technology** could negatively impact the brand image.
- M2** **Economic downturn and rising energy prices** adversely affect Nokia's ability to introduce the developed innovations and to sustain the investment intensive R&D.
- M3** **Costs to implement** the next technological disruption are extremely **high**, which **decelerates the adoption process**.
- O1** Telecom industries generate the growing quantity **e-waste**, which requires the development of strategies to **reduce the rising carbon footprint**.
- O2** **Lack of the support from the government** adversely influences strategic decisions and allows competitors to gain a leg.
- L1** The **trade barriers** could further **hinder entrance** into the growing perspective markets.
- L2** Emergence of new **telecom regulations** paired with the ongoing **crackdown on the tech giants** could necessitate the **overhaul** of the Nokia's **structure**.

Market (M) – Operations (O) – Legislation (L)



# Appendix: Catalysts

Nokia might be unable to recover from AT&T defeat if the overall investment environment for CSPs does not stabilize

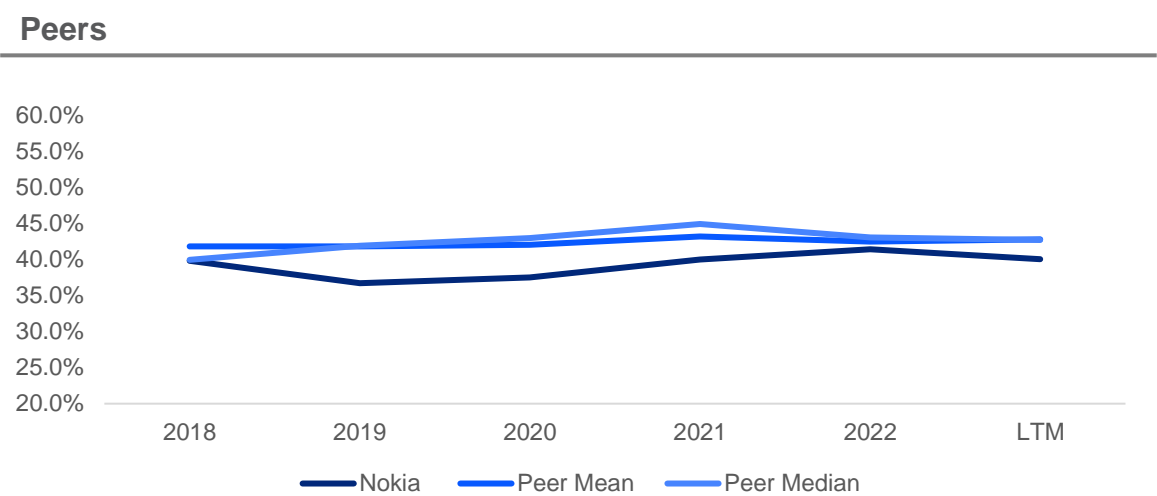
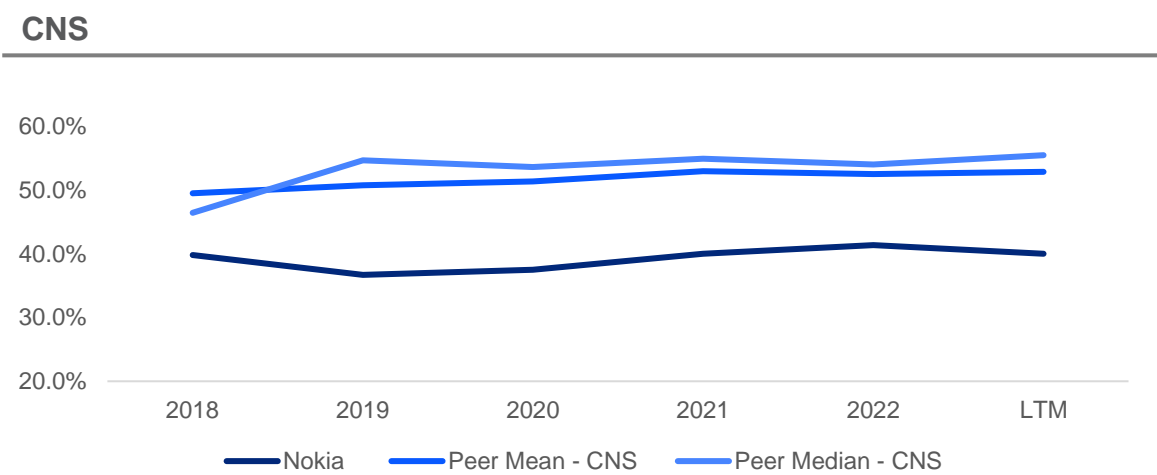
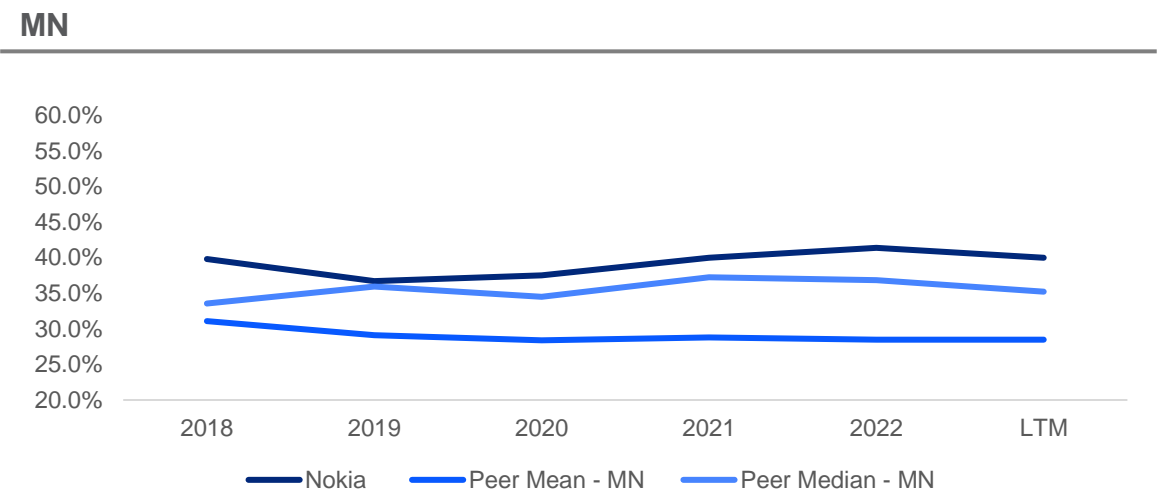
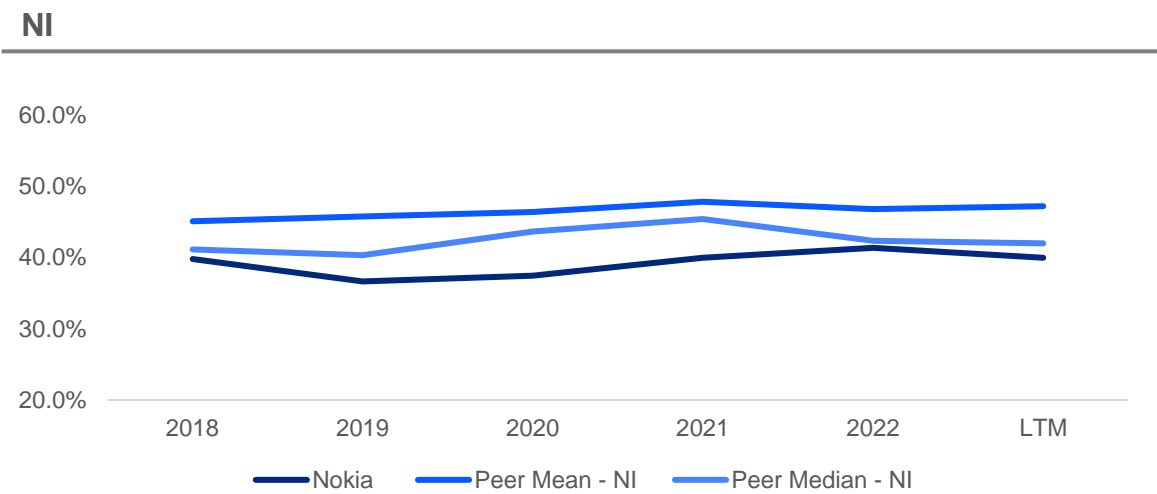
| Catalyst  | Type | Influenced factor       | Estimated impact on share price   |
|---|------|-------------------------|---|
|  <b>New Government Programs</b>                | Hard | Revenue                 |  <b>Strong</b> – Government Programs like BEAD in the US create certain cash flow for telcom equipment giants in the future, thus ensuring financials resilience in uncertain environments               |
|  <b>Lower interest rates</b>                   | Hard | Revenue<br>R&D<br>CapEx |  <b>Strong</b> – One issue why Europe is still lagging behind the rest of the world in terms of 5G deployment is because of its weak economic environment and already high leverage of the European CSPs |
|  <b>Rising demand for data cloud solutions</b> | Soft | Revenue                 |  <b>Medium</b> – Nokia is one of the leading network infrastructure providers for web- and hyperscalers such as Amazon, Google and AWS   |
|  <b>Regulatory landscape</b>                 | Hard | Revenue                 |  <b>Strong</b> – The ban of Chinese companies in the US and EU from supplying network equipment to the Western CSPs world has resulted in market share increases for companies like Nokia               |
|  <b>AT&amp;T defeat</b>                      | Hard | Revenue                 |  <b>Strong</b> – Due to lose of the biggest customer in the US within the Mobile Networks unit Nokia will be unable to recover in the new market verticals such as Private Wireless and Enterprise     |

# Appendix: SWOT-Analysis

Nokia’s strengths can be complemented by addressing customers and countries’ power dynamics

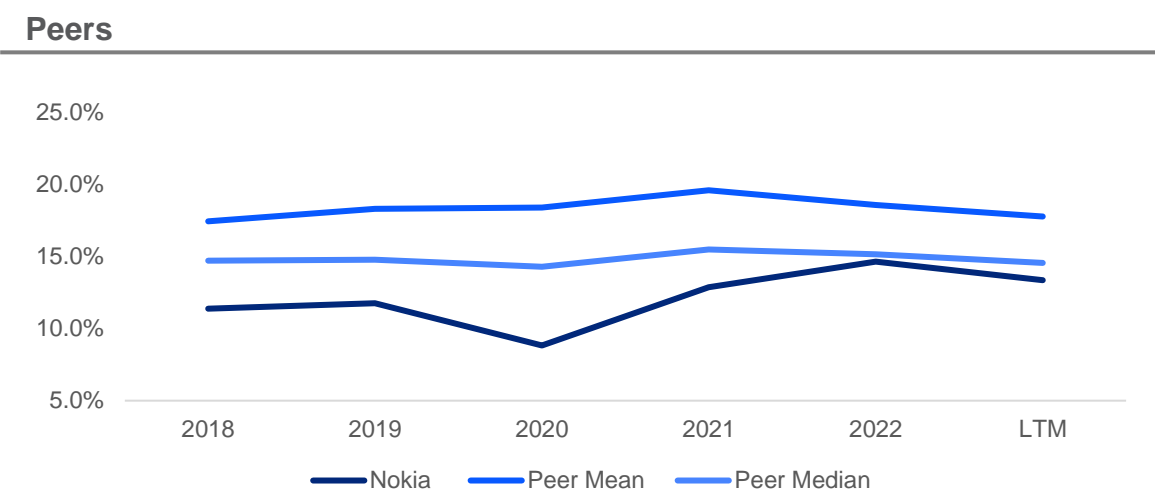
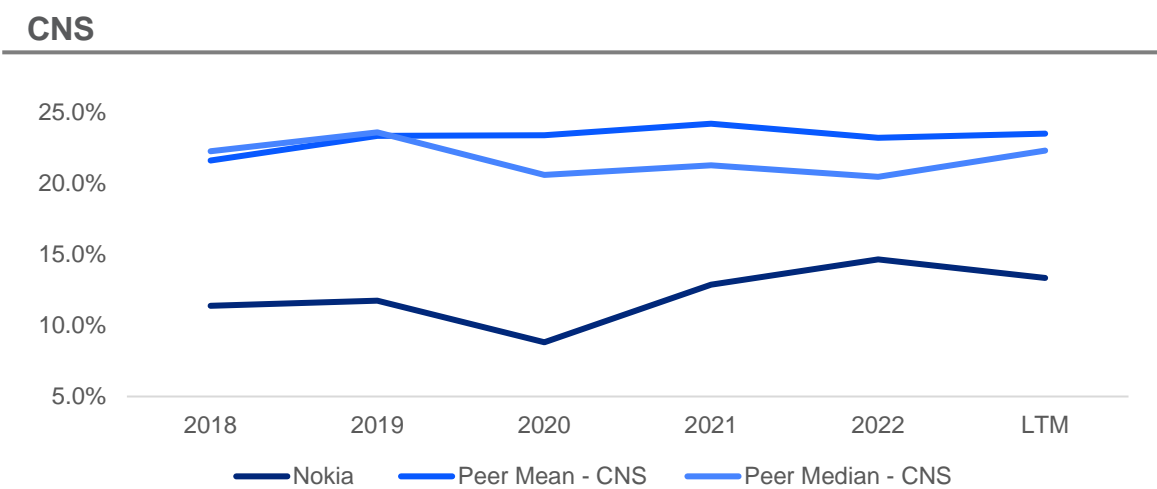
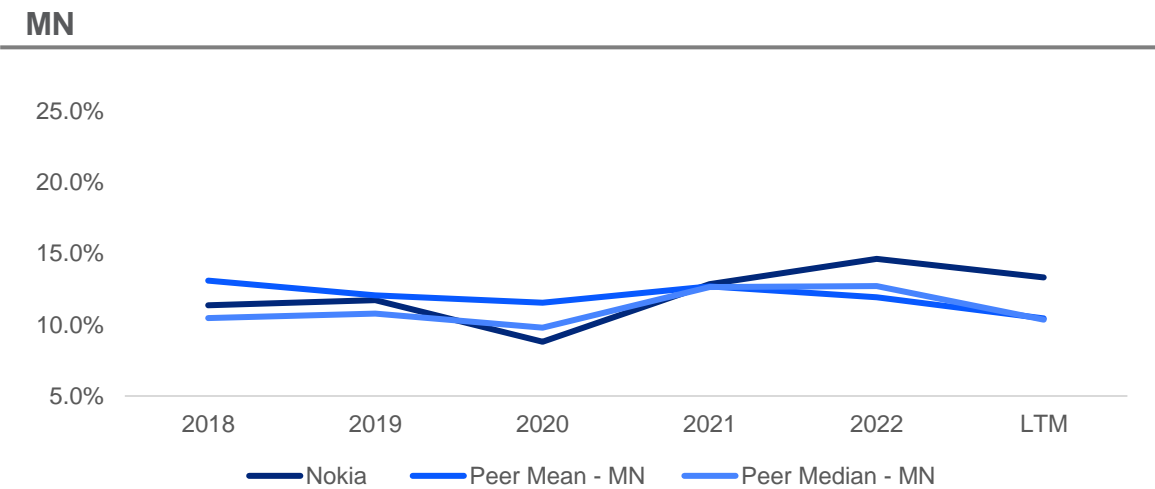
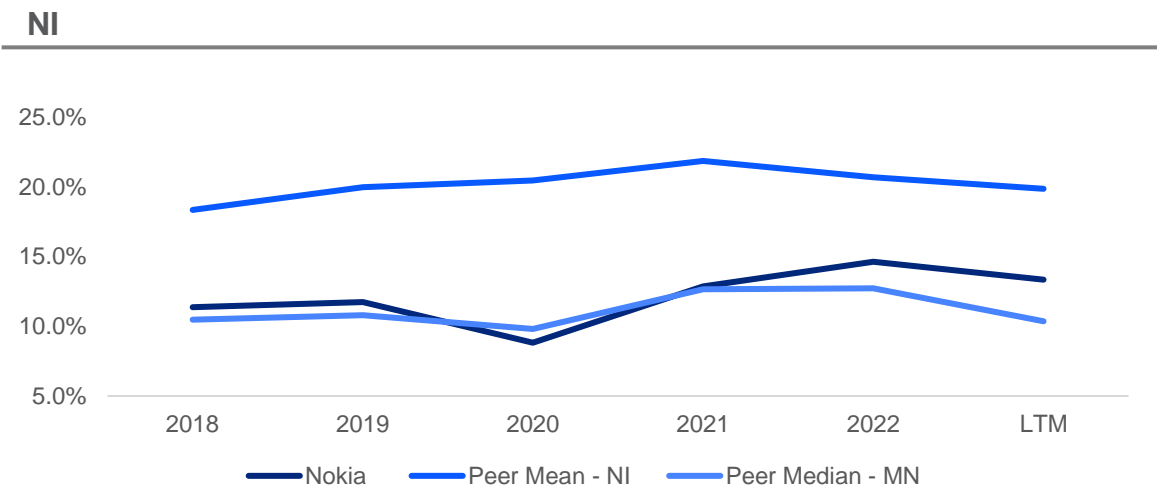
| Nokia’s Prospects   |  |
|---|--|
| <div><div>STRENGTHS</div><div><div><div>1. <b>R&amp;D capabilities:</b> Nokia’s continuous investment into R&amp;D enables innovative solutions, staying ahead of advancements, delivering high-quality products, and maintaining a competitive edge</div><div>2. <b>Established global market presence:</b> A long history and strong reputation in phone and telecom industry, has built Nokia a reputation for reliability.</div><div>3. <b>Strong patent portfolio:</b> Nokia has around 20,000 patents that contribute significantly to its bottom-line.</div></div></div></div> | <div><div>OPPORTUNITIES</div><div><div>1. <b>Growth in the key markets of 5G and IoT:</b> The spread of new technologies such as AI, 5G and IoT generates growing demand and further boosters Nokia financials.</div><div>2. <b>Emerging markets:</b> The emerging markets are leading in the demand for new technologies showing high adoption rates and more willingness to invest into the development of the necessary infrastructure.</div></div></div> |
| <div><div>WEAKNESSES</div><div><div>1. <b>Significant decrease in brand popularity:</b> The strategic mistakes on Nokia’s part led to its exit from consumers market and decreased brand recognition.</div><div>2. <b>Reliance on key customers:</b> The concentration of a significant portion of its revenue from a few key customers exposes Nokia to risks associated with customer preferences, market competition, and losing key customers.</div></div></div>  | <div><div>THREATS</div><div><div>1. <b>Geopolitical risk:</b> Nokia’s close ties to China and India could harm the company if either country faces sanctions or trade bans.</div><div>2. <b>Rapid technological advancements:</b> Nokia has already faced a failure to stay at the forefront of technological advancements, overlooking vital technological disruptions, which could happen again.</div></div></div>   |
| <div><div>S1 + O1</div><div>5G and IoT are still developing and <b>necessitate the innovative R&amp;D solutions</b> to overcome the outstanding challenges,</div></div>   | <div><div>S2 + O1</div><div>Nokia has an <b>established reputation for reliability and innovation</b> that positively impact its standing on the 5G and IoT markets.</div></div>   |
| <div><div>S2 + O2</div><div>Nokia’s <b>long history and market presence</b> ease its entrance to the <b>new growing markets</b>.</div></div>  | <div><div>S3 + O2</div><div>The company holds a <b>large number of patents</b> with more patents to come in <b>growing 5G and IoT segments</b>.</div></div>  |
| <div><div>W1 + T2</div><div>The <b>failure</b> to adopt some of the key <b>tech innovations</b> precipitated Nokia’s <b>decreased brand recognition</b>, which could happen again.</div></div>  | <div><div>W2 + T1</div><div>Nokia is <b>reliant on several big customers</b> that are often located in the countries like <b>China and India</b>.</div></div>  |

# Appendix: Gross Margin

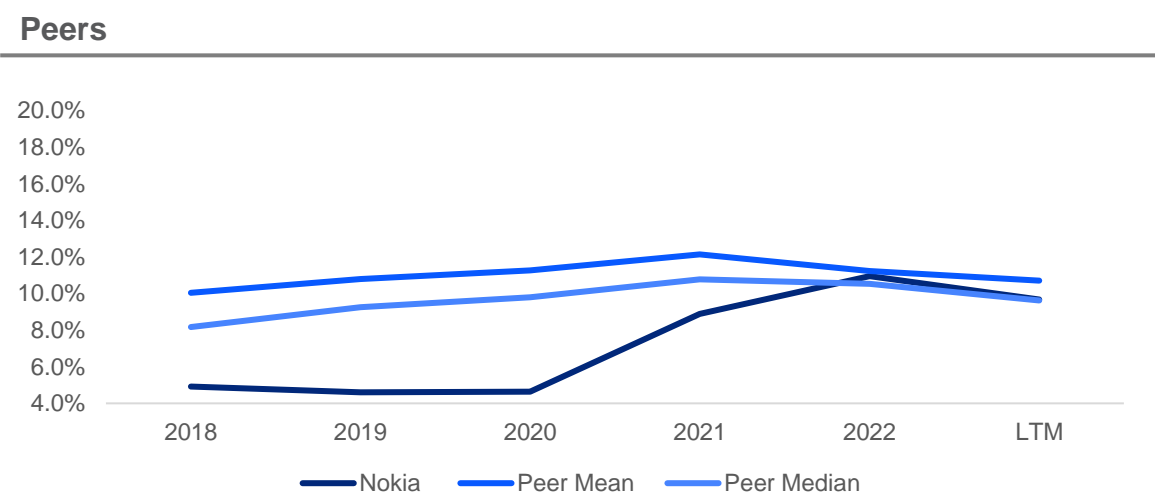
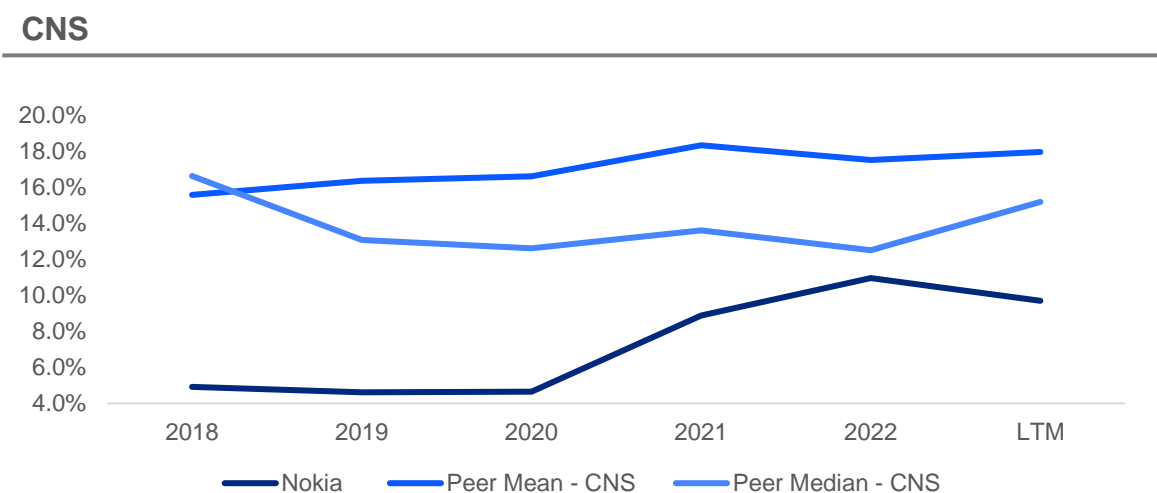
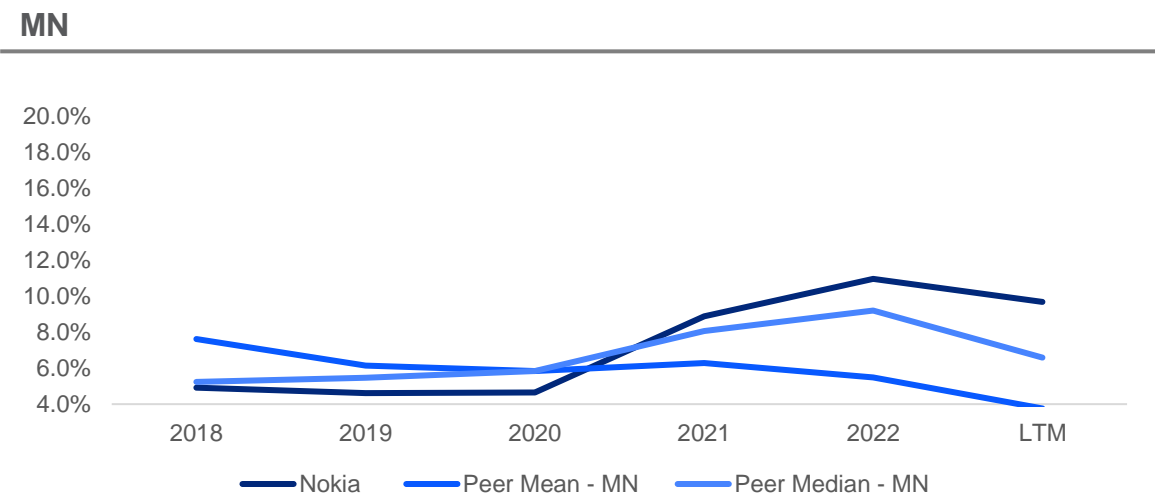
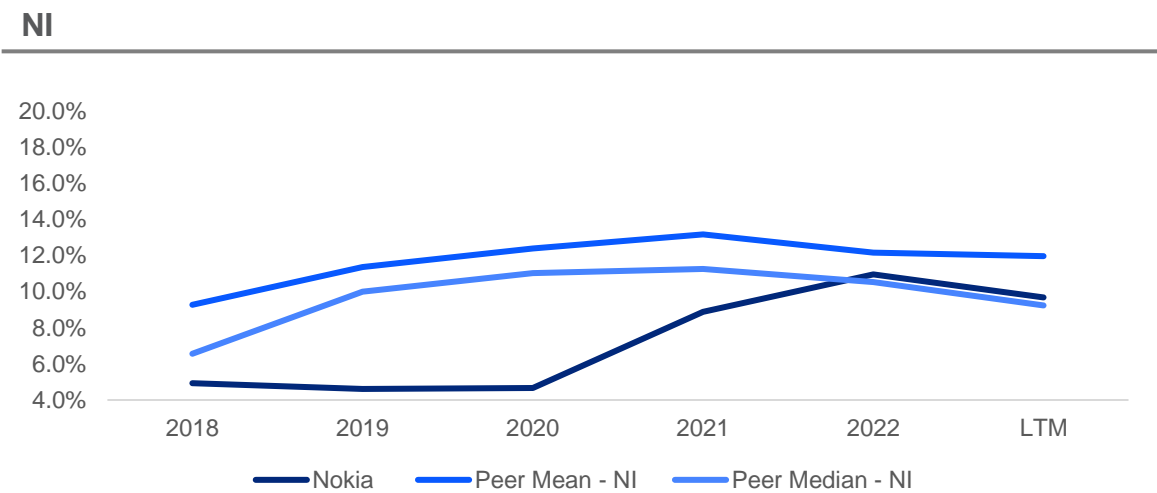




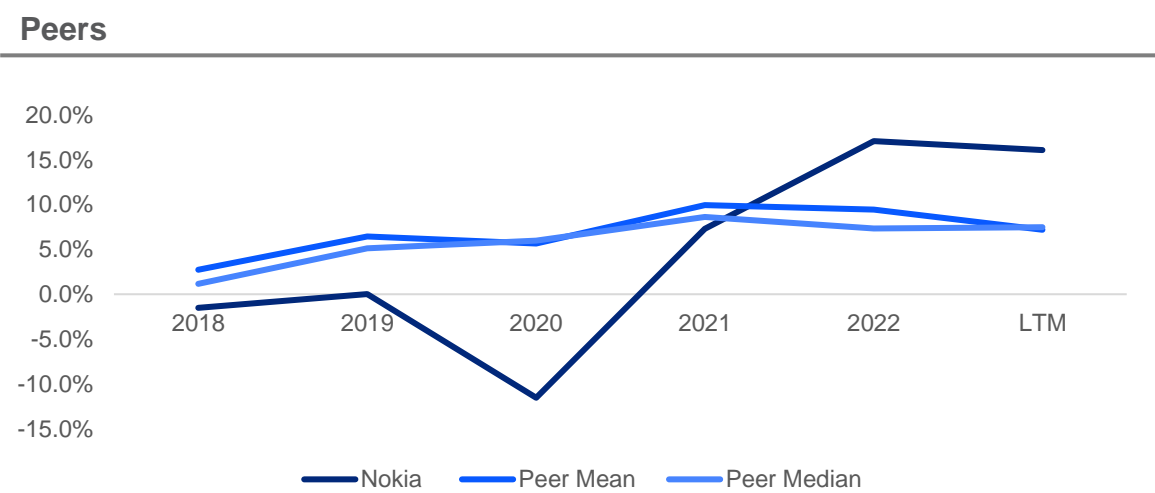
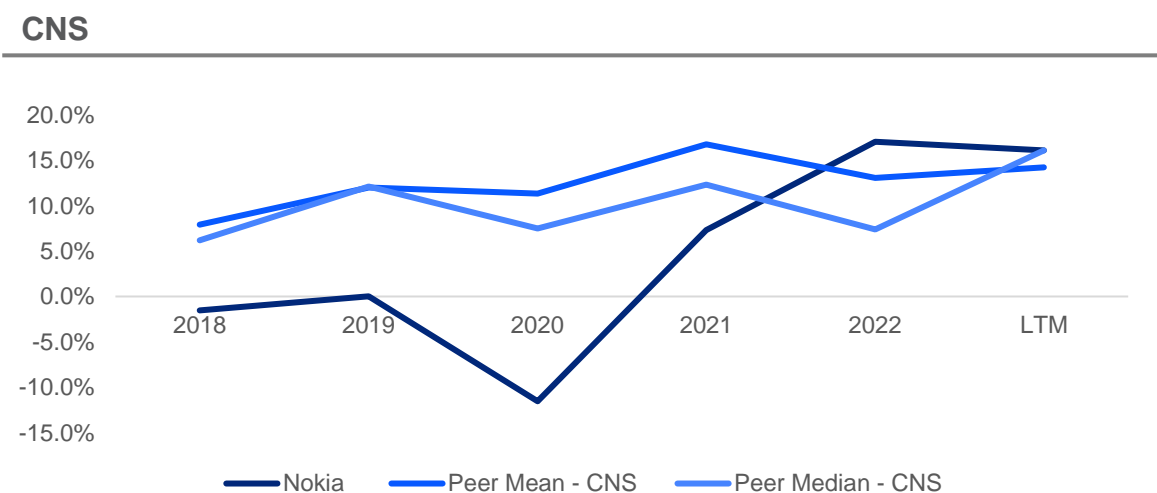
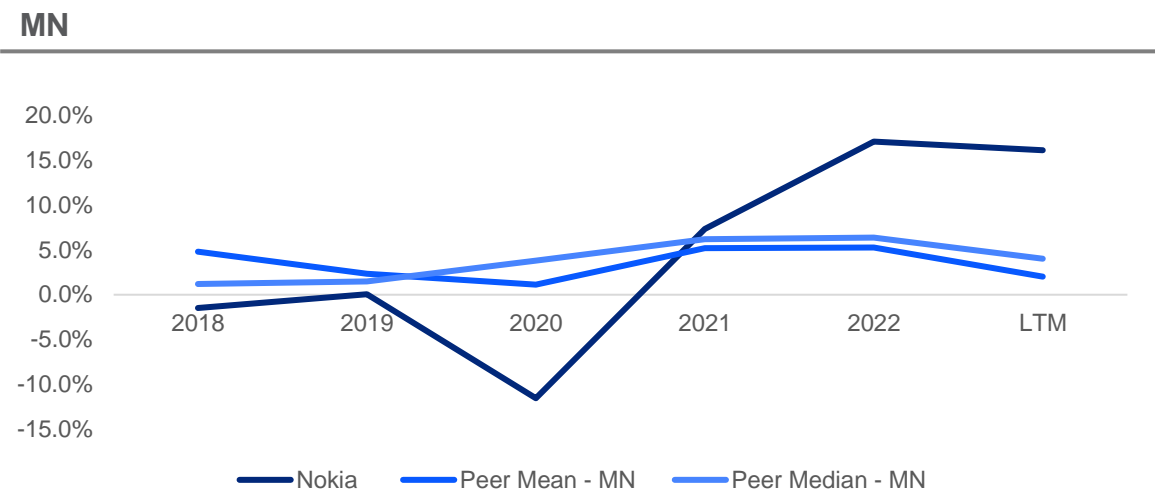
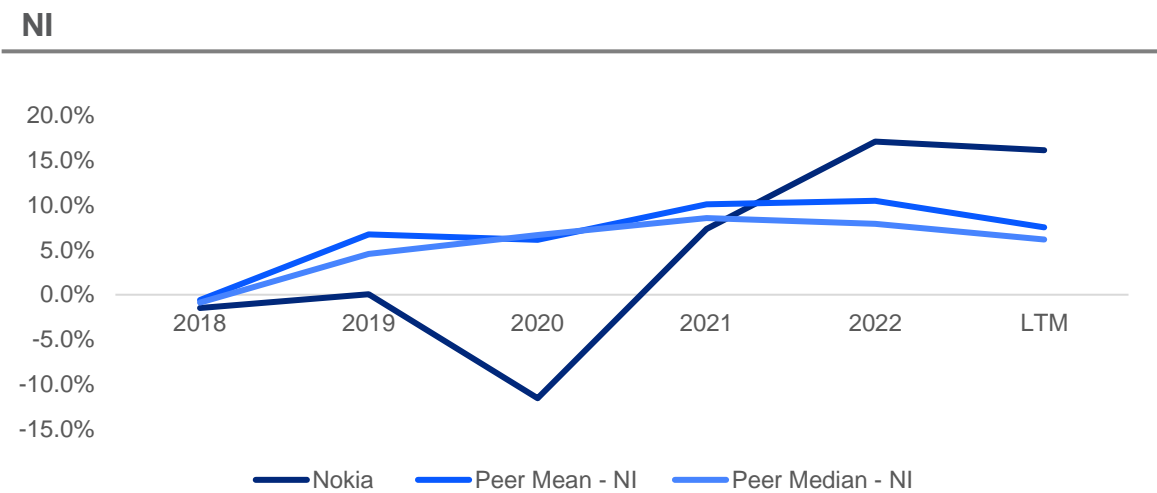
# Appendix: EBITDA Margin



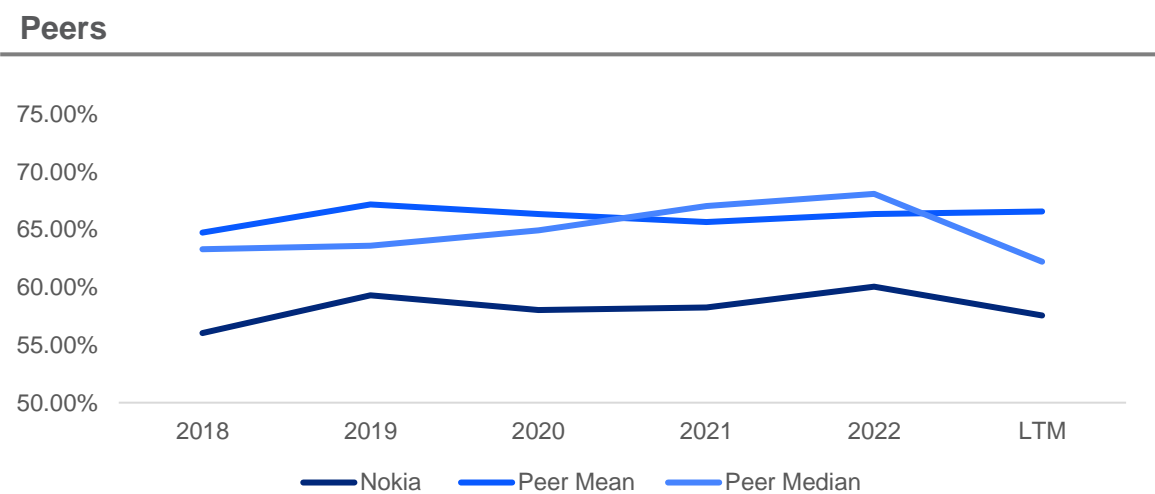
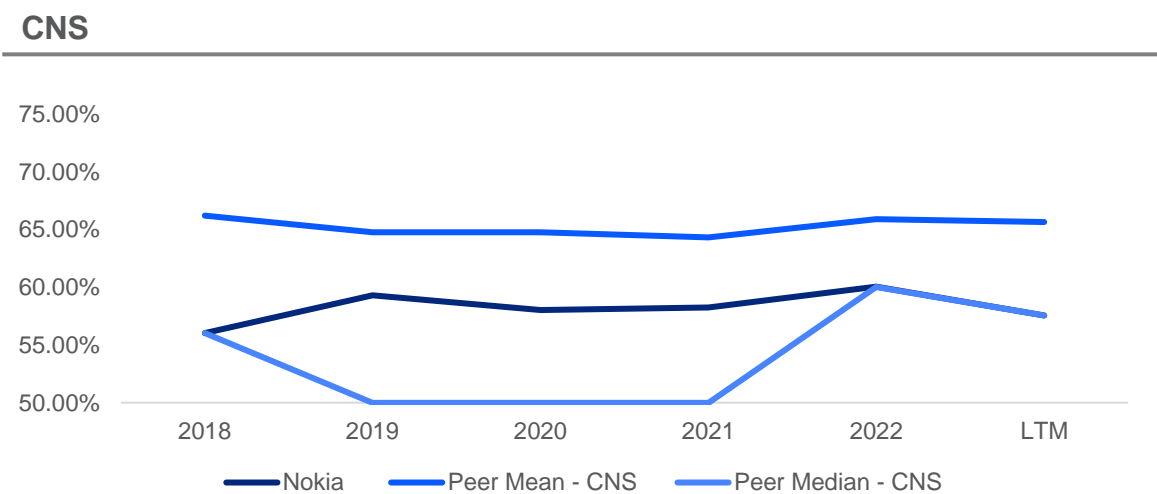
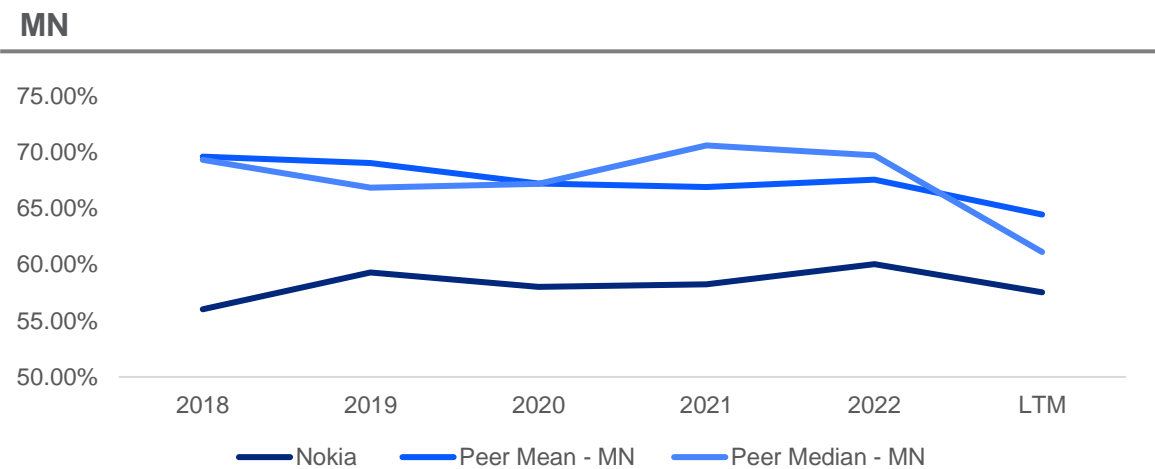
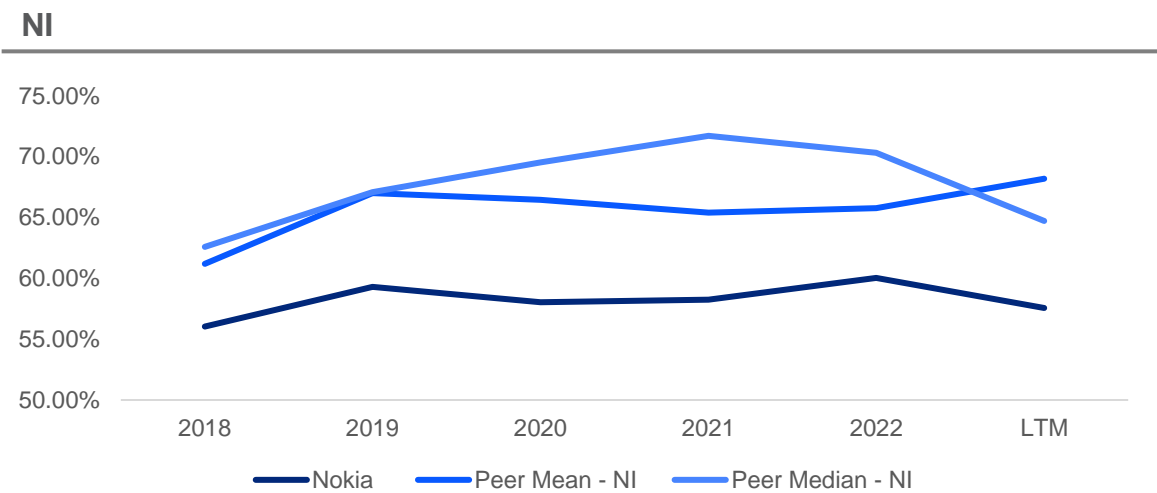
# Appendix: EBIT Margin



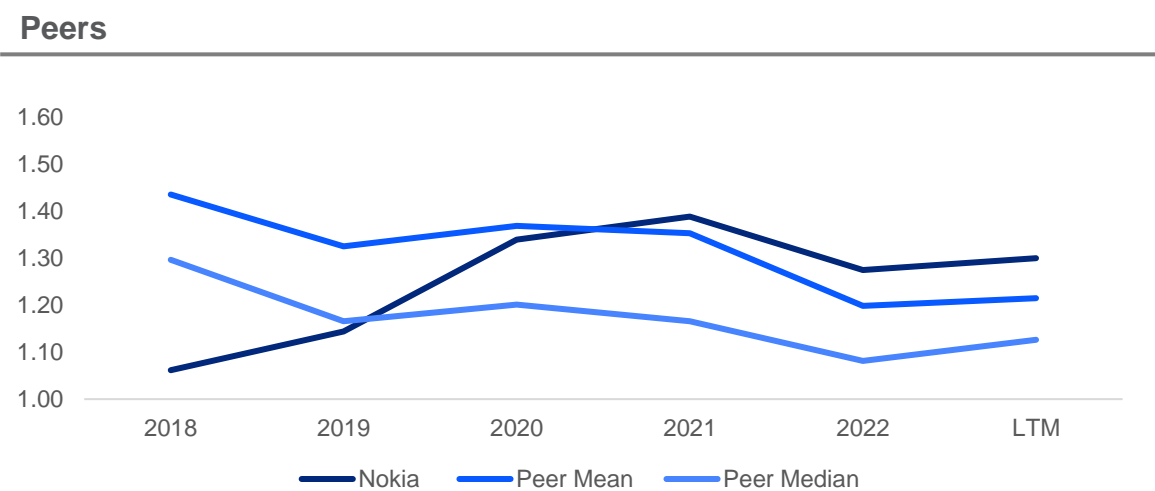
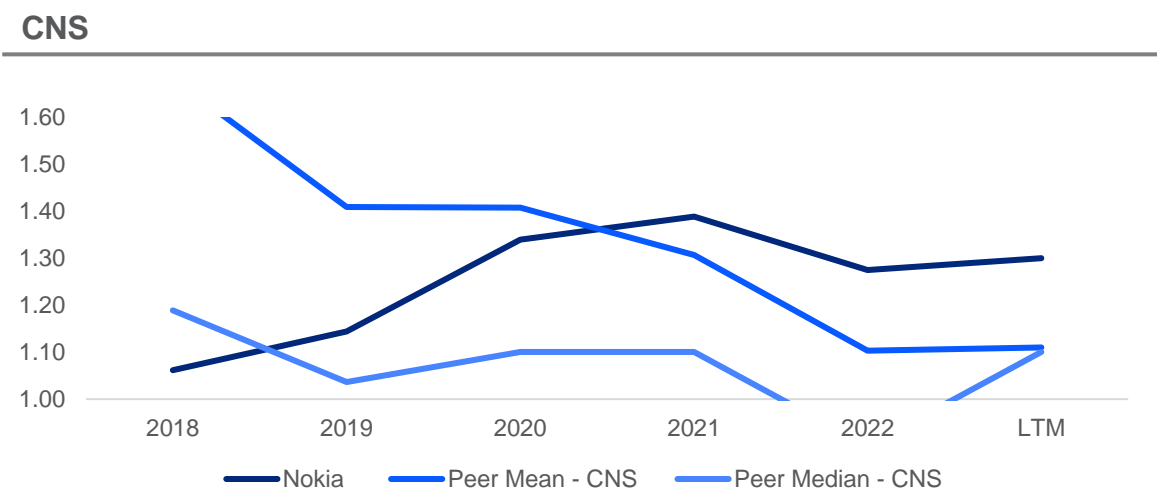
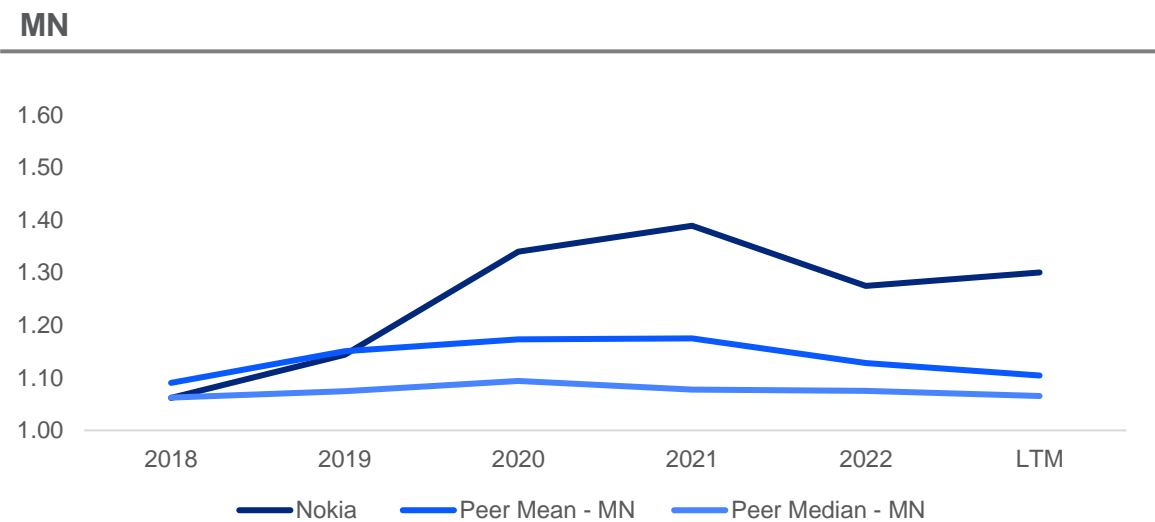
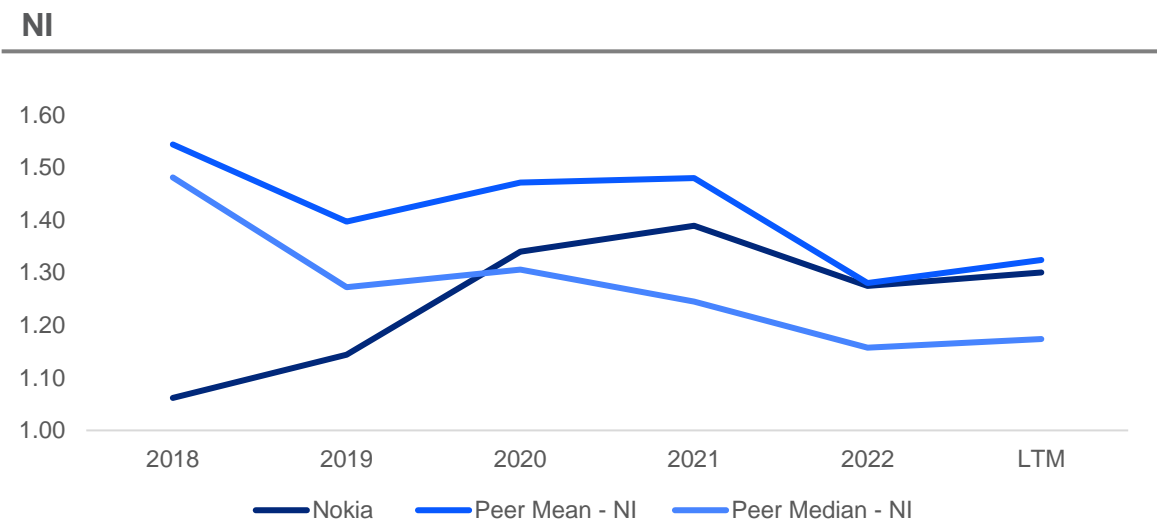
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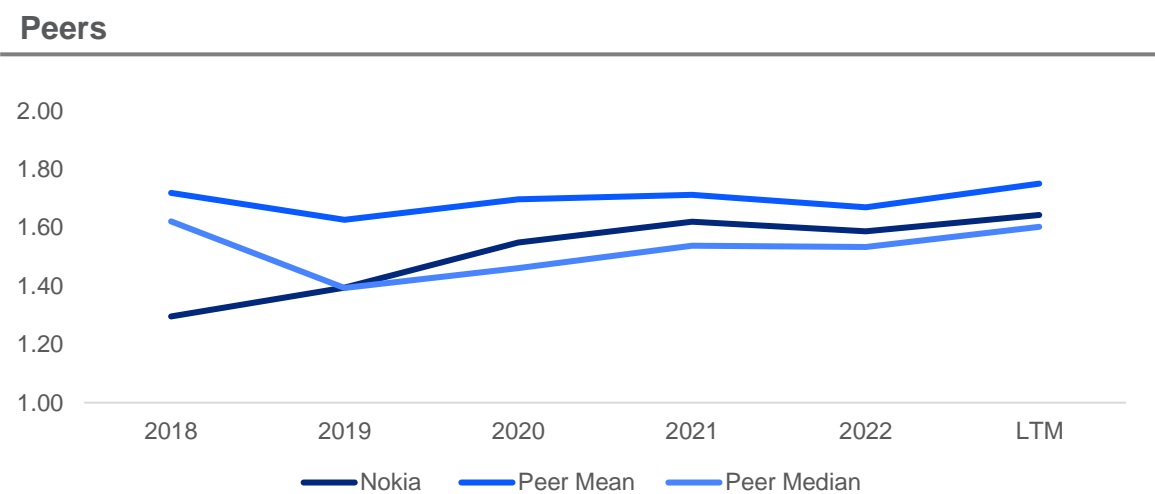
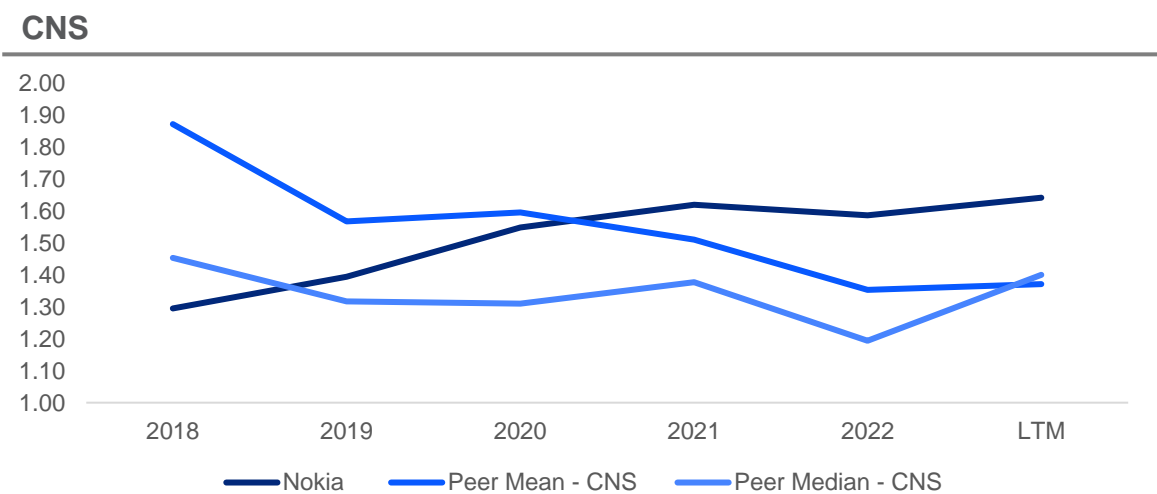
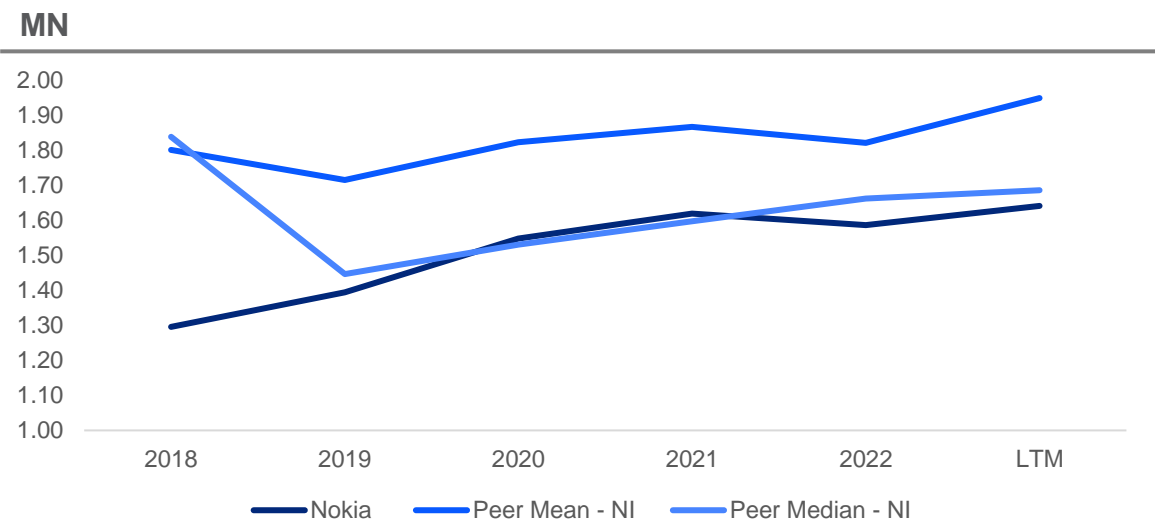
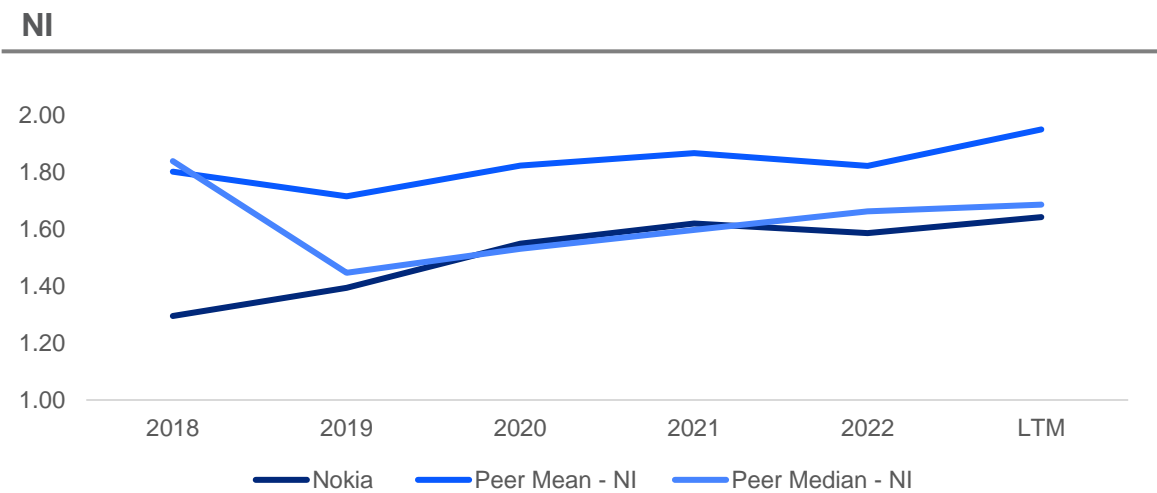
# Appendix: Turnover Ratio



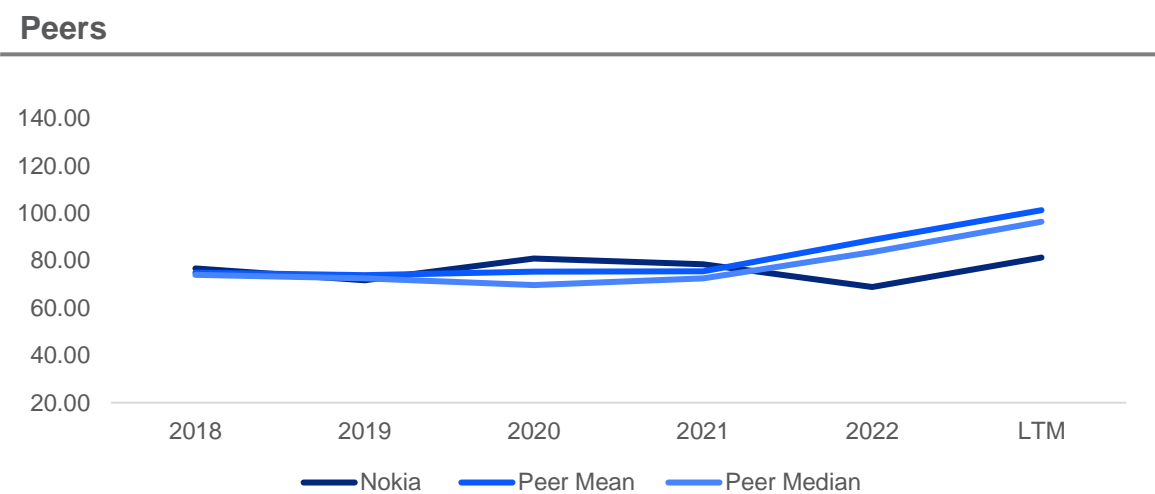
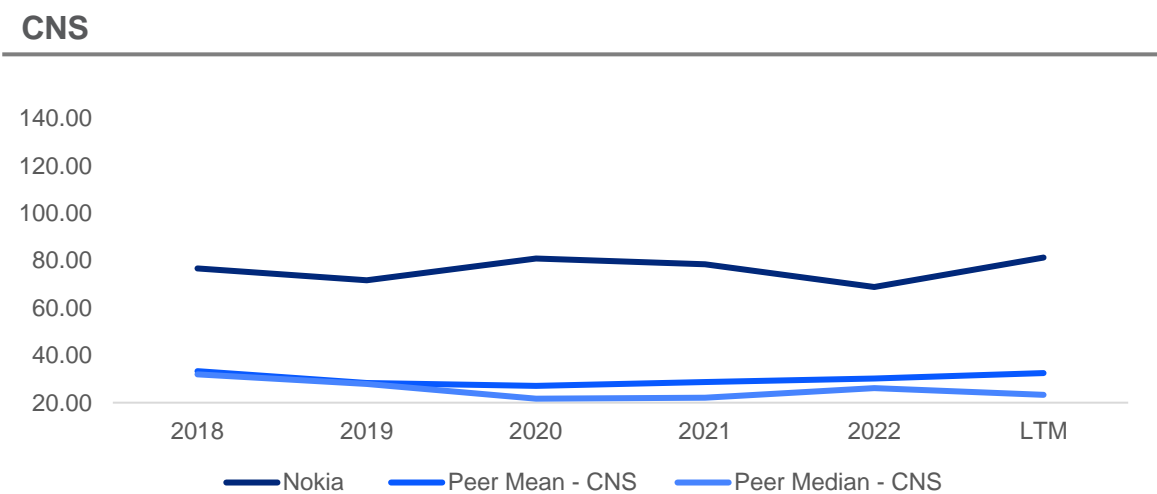
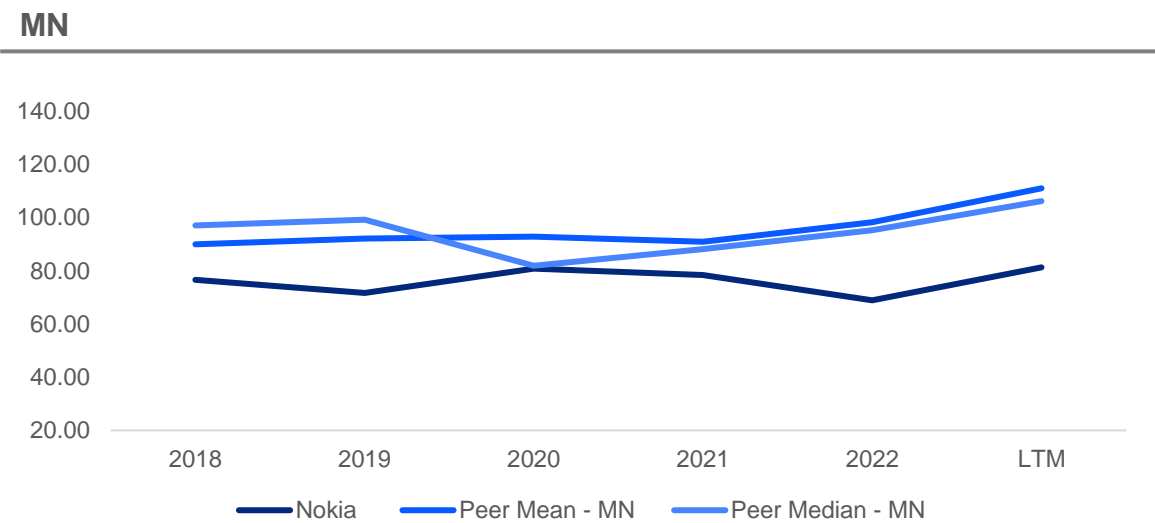
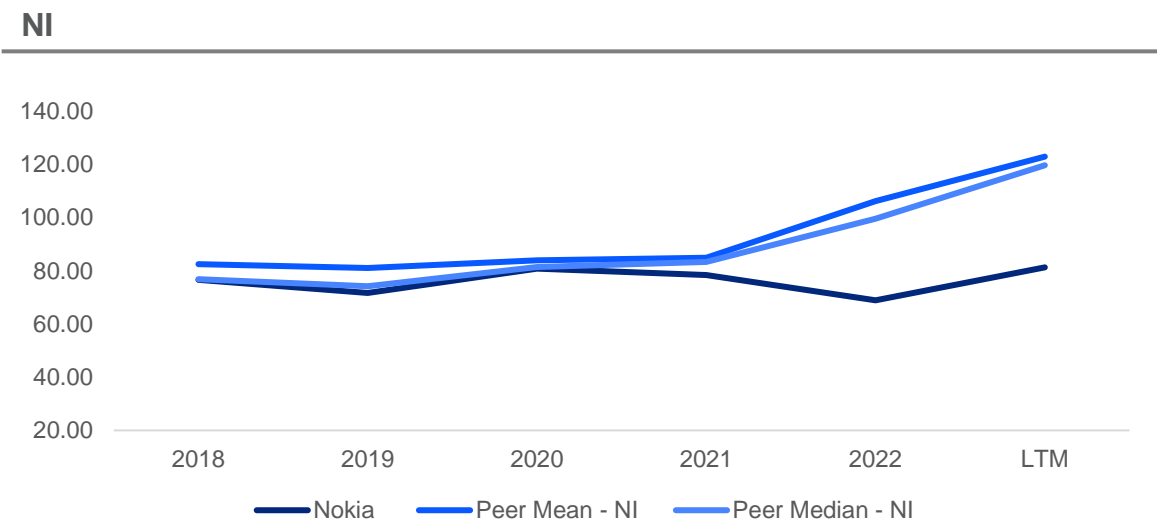




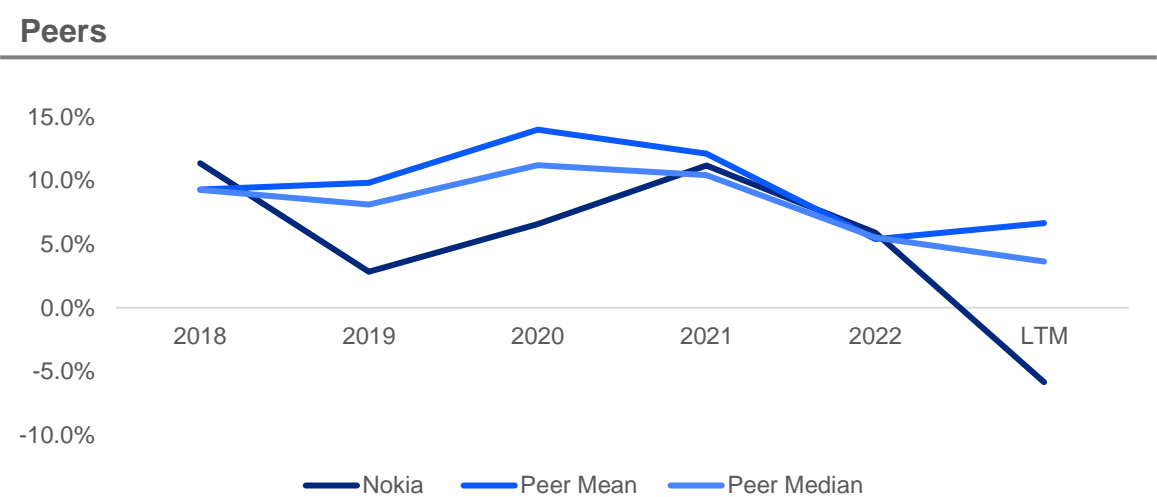
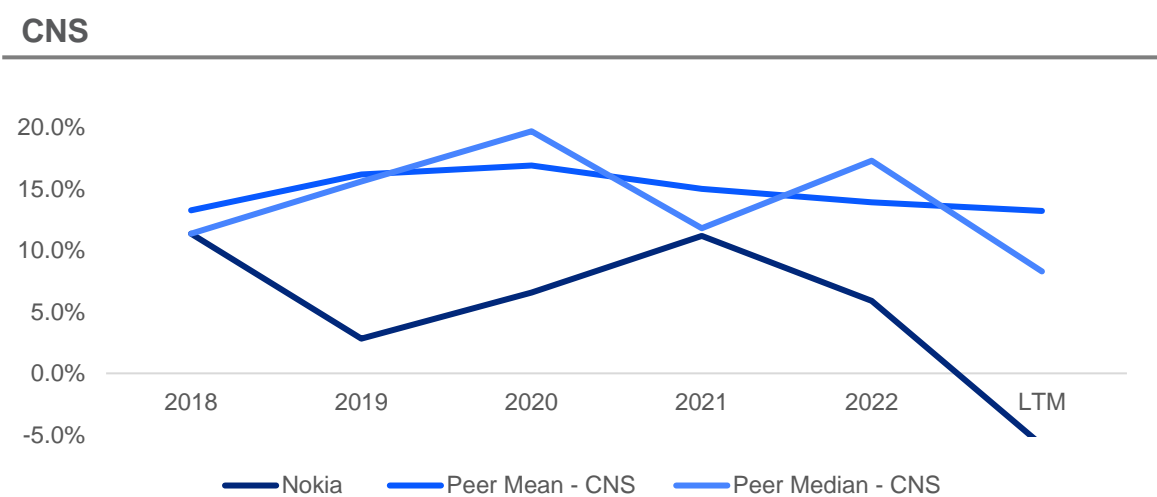
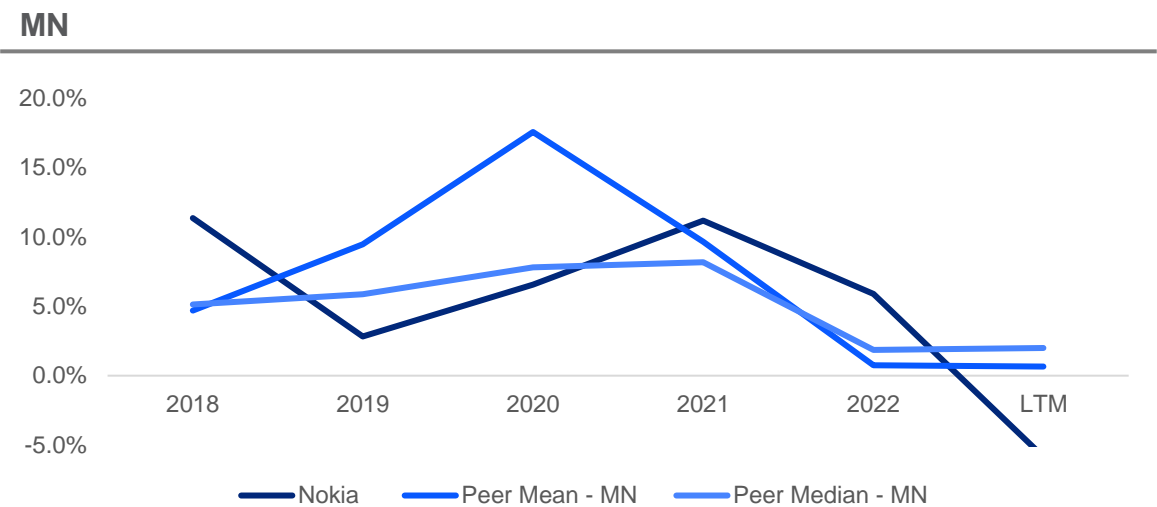
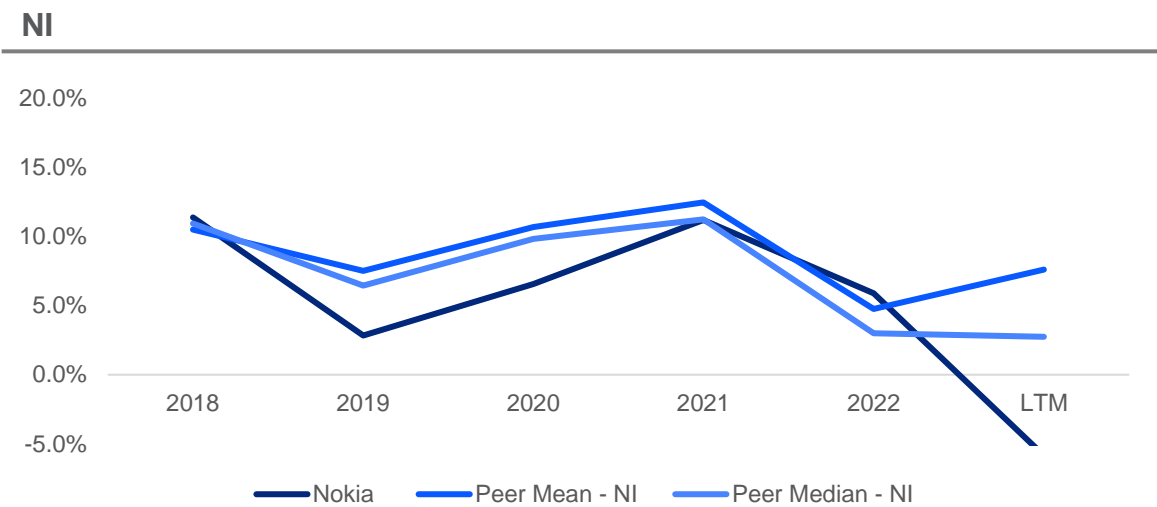
# Appendix: Current Ratio



# Appendix: Cash Conversion Cycle

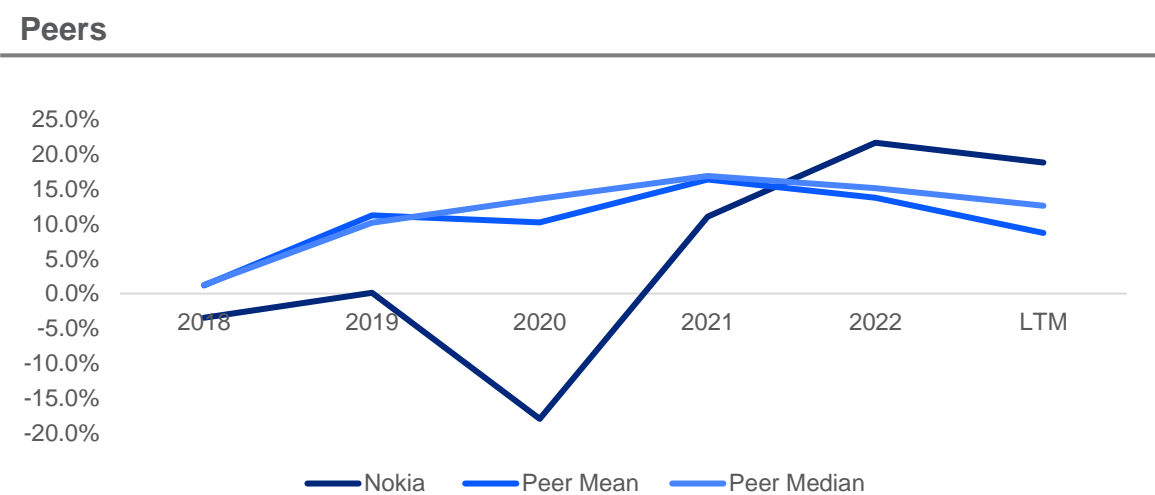
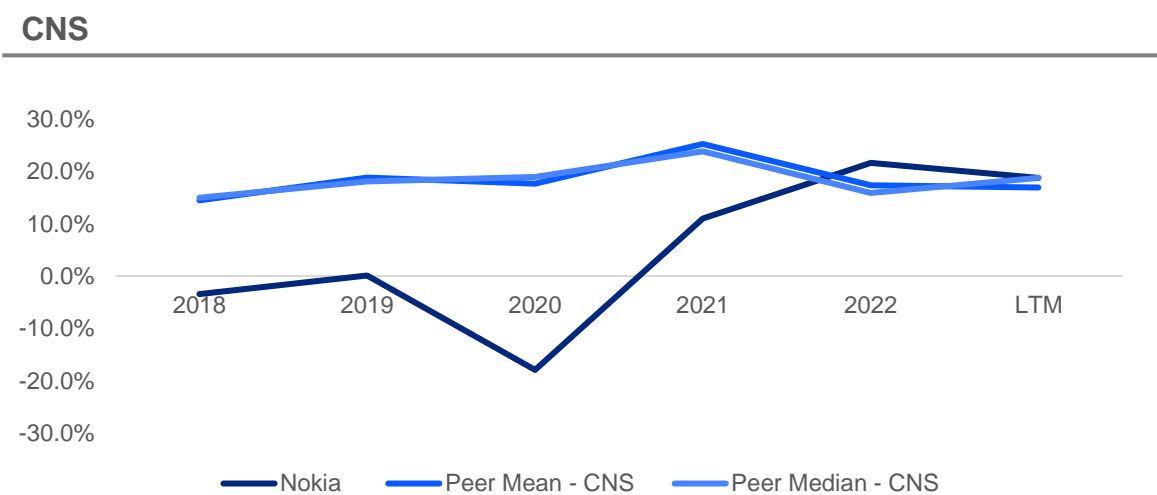
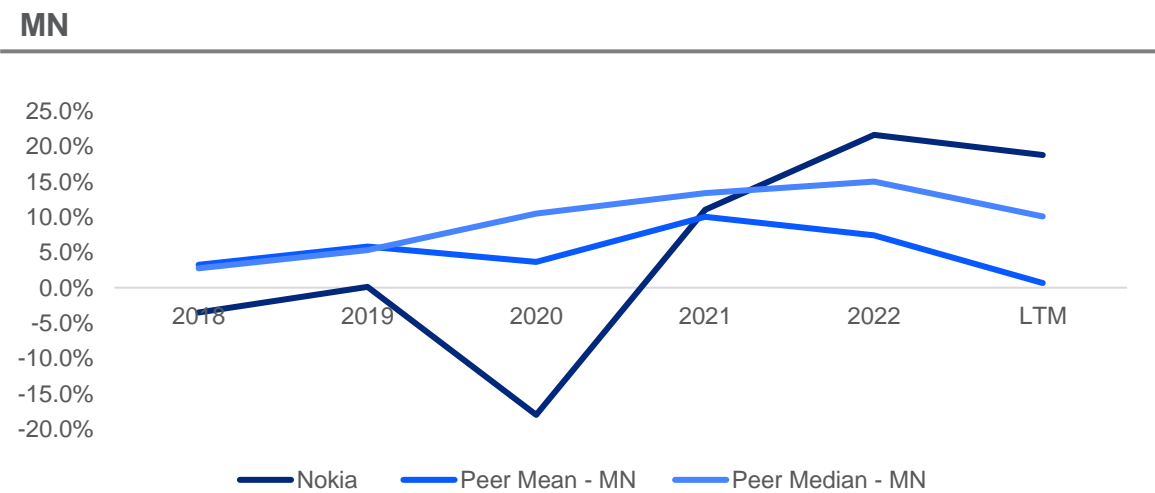
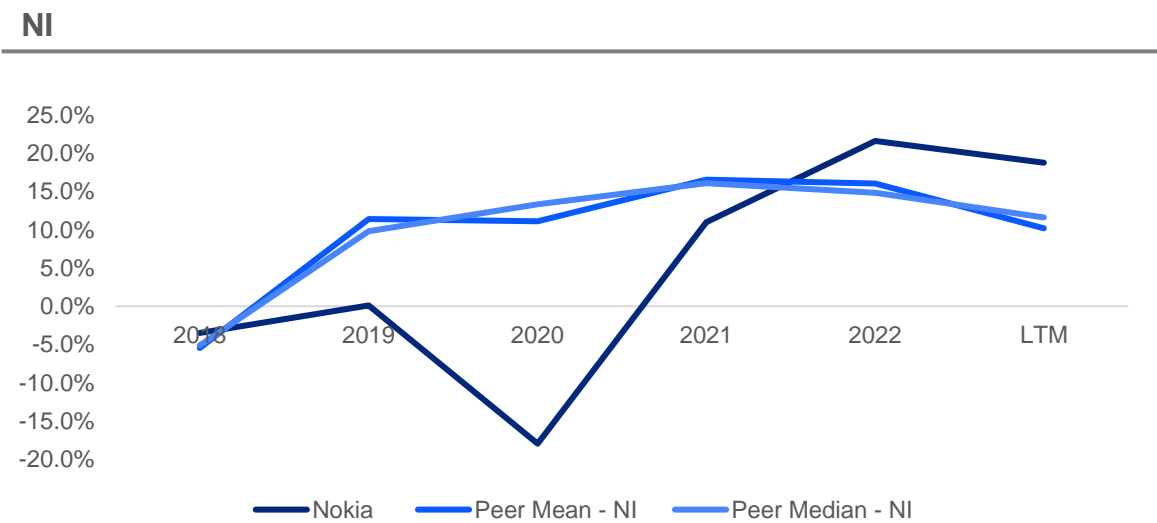


# Appendix: FCF Margin

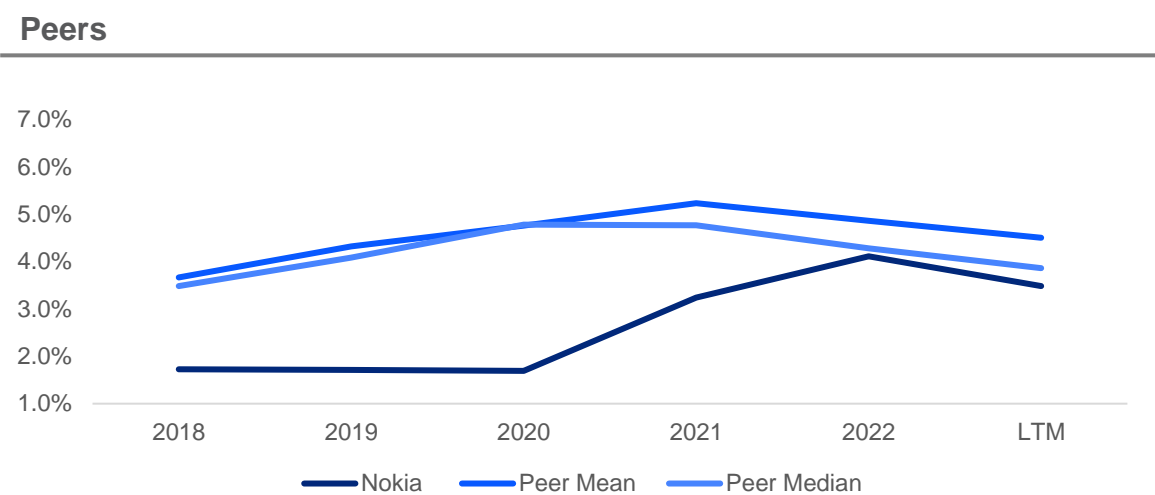
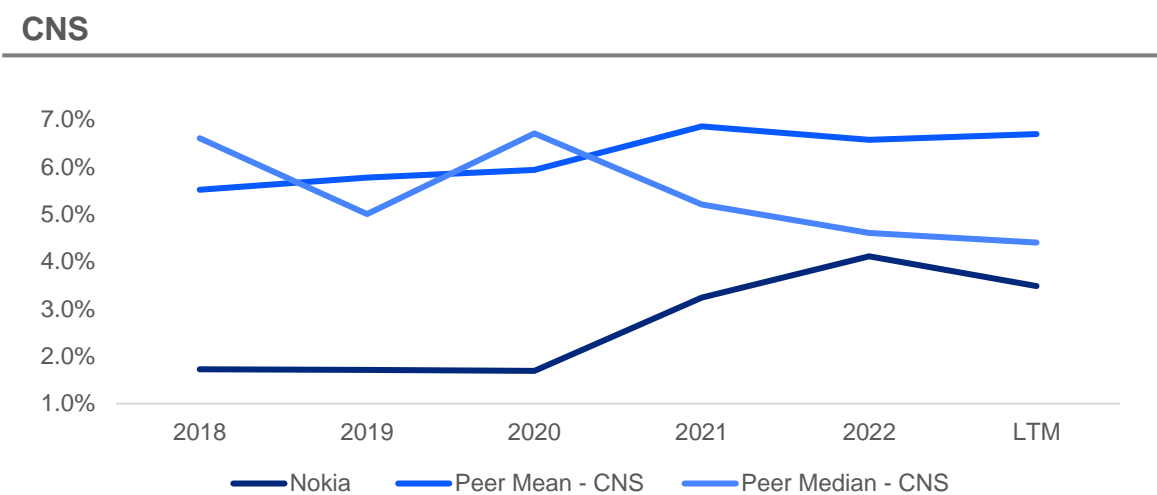
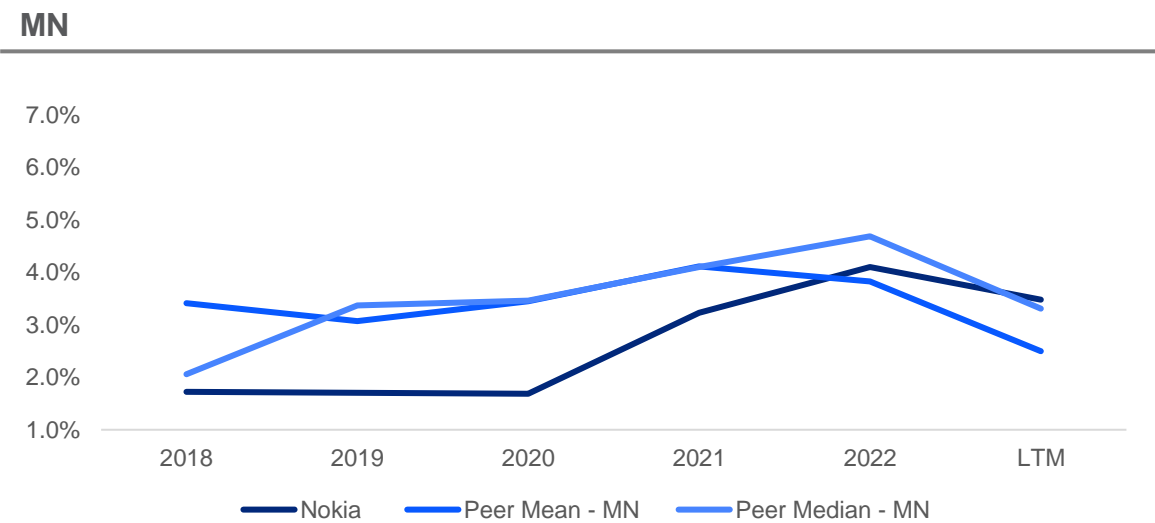
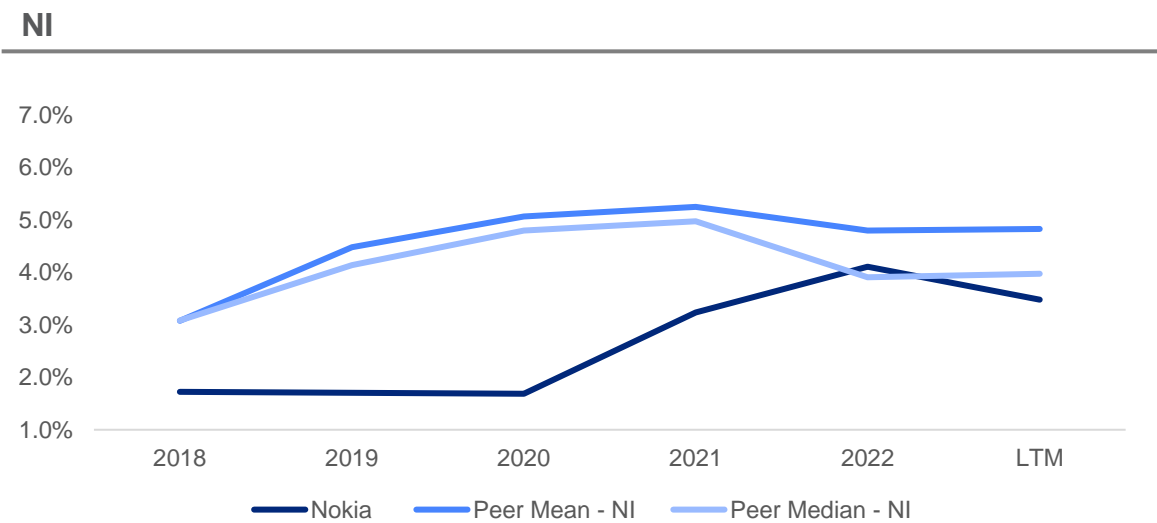


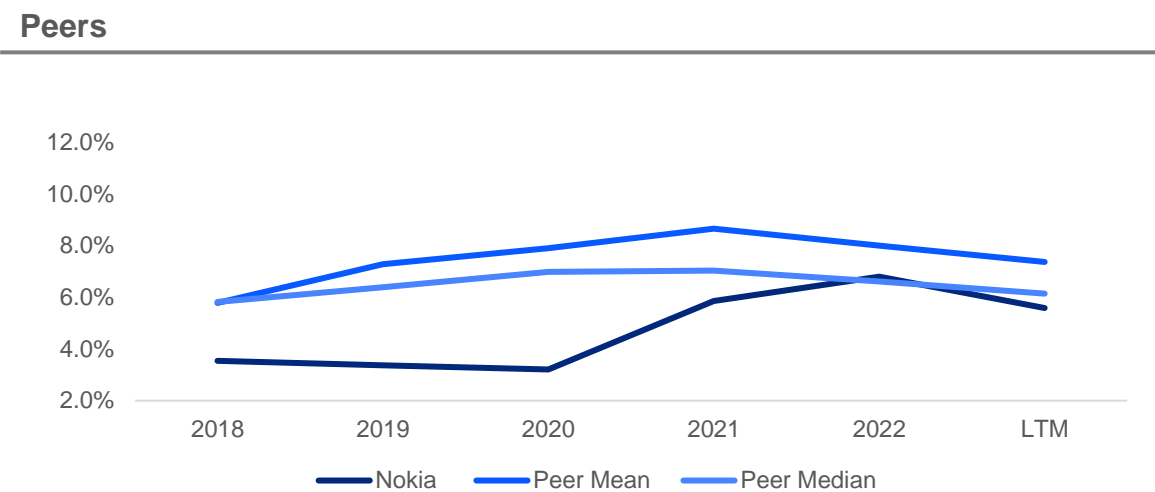
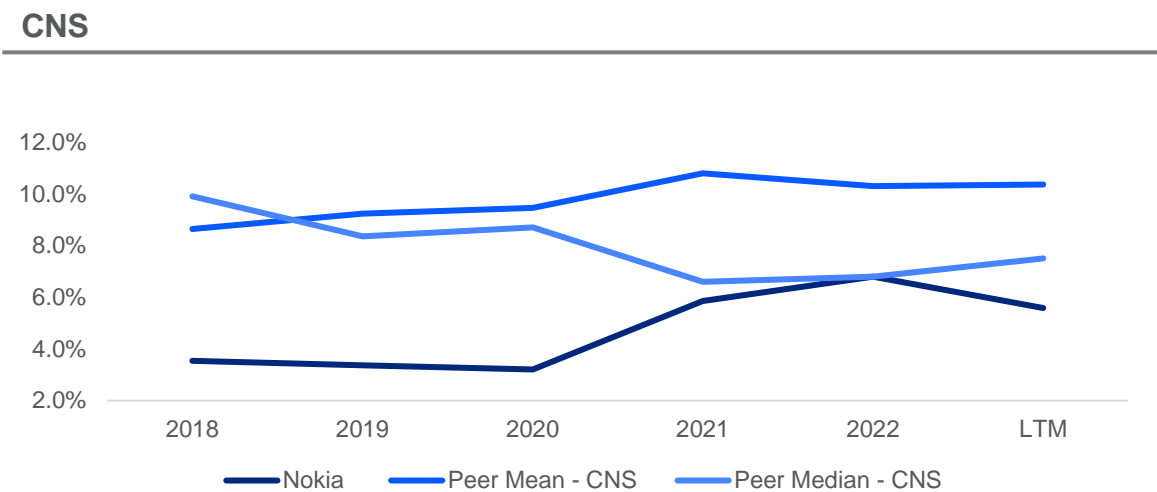
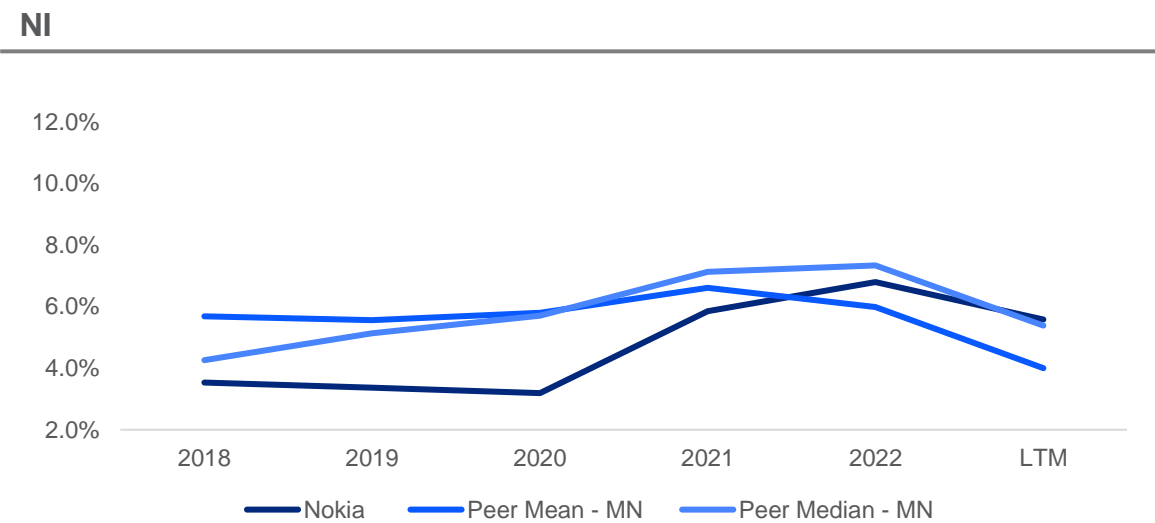
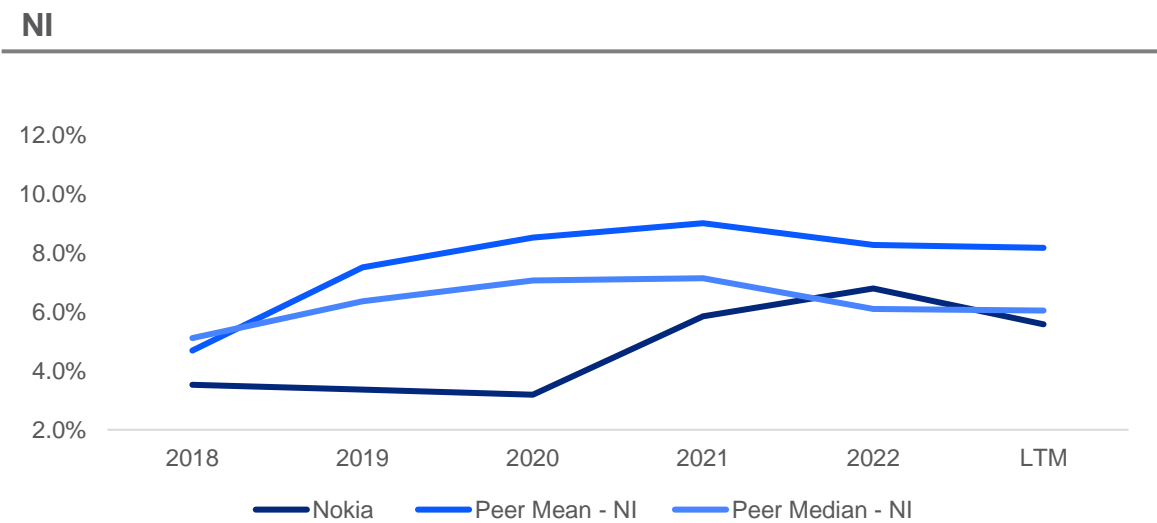


# Appendix: Return on Equity



# Appendix: Return on Assets





# Appendix: Operating Model I

## Income Statement

| Income Statement  |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
|---|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|------|---------|----------|----------|----------|----------|
| 002506  |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue   | 11.762  | 12.499  | 23.614   | 23.147   | 22.563   | 23.315   | 21.852   | 22.202   | 24.911   | 16.551   |      | 5.707   | 22.258   | 22.778   | 23.431   | 24.279   |
| % Growth Rate   |         | 6%      | 89%      | -2%      | -3%      | 3%       | -6%      | 2%       | 12%      | -5%      | 11%  | -23%    | -11%     | 2%       | 3%       | 4%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue Network Infrastructure                              |         |         |          |          |          | 6.903    | 6.736    | 7.674    | 9.047    | 6.034    |      | 2.003   | 8.037    | 8.439    | 8.776    | 9.127    |
| % Growth Rate   |         |         |          |          |          | -2%      | 14%      | 18%      | -5%      | 6%       |      | -26%    | -11%     | 5%       | 4%       | 4%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue Mobile Networks                                     |         |         |          |          |          | 11.327   | 10.398   | 9.717    | 10.671   | 7.347    |      | 2.450   | 9.797    | 9.699    | 9.796    | 10.090   |
| % Growth Rate   |         |         |          |          |          | -8%      | -7%      | 10%      | -5%      | -2%      |      | -17%    | -8%      | -1%      | 1%       | 3%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue Cloud and Network Services                          |         |         |          |          |          | 3.327    | 3.087    | 3.089    | 3.351    | 2.243    |      | 977     | 3.220    | 3.317    | 3.416    | 3.553    |
| % Growth Rate   |         |         |          |          |          | -7%      | 0%       | 8%       | -2%      | 0%       |      | -8%     | -4%      | 3%       | 3%       | 4%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue Nokia Technologies                                  |         |         |          |          |          | 1.487    | 1.402    | 1.502    | 1.595    | 834      |      | 251     | 1.085    | 1.194    | 1.313    | 1.378    |
| % Growth Rate   |         |         |          |          |          | -6%      | 7%       | 6%       | -9%      | 0%       |      | -63%    | -32%     | 10%      | 10%      | 5%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Revenue Group Common and Other                              |         |         |          |          |          | 371      | 269      | 257      | 295      | 106      |      | 24      | 130      | 130      | 130      | 130      |
| % Growth Rate   |         |         |          |          |          | -27%     | -4%      | 15%      | -55%     |          |      | -59%    | -56%     | 0%       | 0%       | 0%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Operating Expenses and Income                               |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales   | (6.774) | (6.963) | (15.158) | (14.008) | (14.117) | (14.989) | (13.659) | (13.368) | (14.689) | (10.250) |      | (3.321) | (13.571) | (13.345) | (13.557) | (13.976) |
| % of sales  | 58%     | 56%     | 64%      | 61%      | 63%      | 64%      | 63%      | 60%      | 59%      | 62%      | 61%  | 58%     | 61%      | 59%      | 58%      | 58%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales Network Infrastructure                        |         |         |          |          |          | (4.446)  | (4.375)  | (4.990)  | (5.739)  | (3.788)  |      | (1.199) | (4.987)  | (5.341)  | (5.543)  | (5.759)  |
| % of sales  |         |         |          |          |          | 64%      | 65%      | 65%      | 63%      | 63%      | 64%  | 60%     | 62%      | 63%      | 63%      | 63%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales Mobile Networks                               |         |         |          |          |          | (8.007)  | (6.666)  | (6.080)  | (6.575)  | (4.852)  |      | (1.512) | (6.364)  | (5.904)  | (5.891)  | (6.032)  |
| % of sales  |         |         |          |          |          | 71%      | 64%      | 63%      | 62%      | 66%      | 65%  | 62%     | 65%      | 61%      | 60%      | 60%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales Cloud and Network Services                    |         |         |          |          |          | (2.044)  | (2.071)  | (1.929)  | (2.011)  | (1.432)  |      | (512)   | (1.944)  | (1.966)  | (1.989)  | (2.051)  |
| % of sales  |         |         |          |          |          | 61%      | 67%      | 62%      | 60%      | 64%      | 63%  | 52%     | 60%      | 59%      | 58%      | 58%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales Nokia Technologies                            |         |         |          |          |          | (28)     | (9)      | (5)      | (5)      | 0        |      | 0       | 0        | (4)      | (4)      | (4)      |
| % of sales  |         |         |          |          |          | 2%       | 1%       | 0%       | 0%       | 0%       | 1%   | 0%      | 0%       | 0%       | 0%       | 0%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Cost of sales Group Common and Other                        |         |         |          |          |          | (367)    | (262)    | (270)    | (307)    | (114)    |      | (22)    | (136)    | (130)    | (130)    | (130)    |
| % of sales  |         |         |          |          |          | 99%      | 97%      | 105%     | 104%     | 108%     | 103% | 92%     | 105%     | 100%     | 100%     | 100%     |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Gross profit  | 4.988   | 5.536   | 8.456    | 9.139    | 8.446    | 8.326    | 8.193    | 8.834    | 10.222   | 6.301    |      | 2.386   | 8.687    | 9.433    | 9.874    | 10.303   |
| % of sales  | 42%     | 44%     | 36%      | 39%      | 37%      | 36%      | 37%      | 40%      | 41%      | 38%      | 39%  | 42%     | 39%      | 41%      | 42%      | 42%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Research and development expenses                           | (1.904) | (2.080) | (4.904)  | (4.916)  | (4.620)  | (4.411)  | (4.087)  | (4.214)  | (4.550)  | (3.235)  |      | (1.092) | (4.327)  | (4.322)  | (4.445)  | (4.606)  |
| % of sales  | 16%     | 17%     | 21%      | 21%      | 20%      | 19%      | 19%      | 19%      | 18%      | 20%      | 19%  | 19%     | 19%      | 19%      | 19%      | 19%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Selling, general and administrative expenses                | (1.559) | (1.772) | (3.819)  | (3.615)  | (3.463)  | (3.101)  | (2.898)  | (2.792)  | (3.013)  | (2.142)  |      | (787)   | (2.929)  | (2.475)  | (2.266)  | (2.208)  |
| % of sales  | 13%     | 14%     | 16%      | 16%      | 15%      | 13%      | 13%      | 13%      | 12%      | 13%      | 14%  | 14%     | 13%      | 11%      | 10%      | 9%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Other operating income and expenses                         | (111)   | 13      | (833)    | (592)    | (422)    | (329)    | (323)    | 330      | (341)    | 217      |      | 40      | 257      | (234)    | (240)    | (249)    |
| % of sales  | 1%      | 0%      | 4%       | 3%       | 2%       | 1%       | 1%       | -1%      | 1%       | -1%      | 1%   | -1%     | -1%      | 1%       | 1%       | 1%       |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Operating profit/(loss) (EBIT)                              | 1.414   | 1.697   | (1.100)  | 16       | (59)     | 485      | 885      | 2.158    | 2.318    | 1.141    |      | 547     | 1.688    | 2.402    | 2.922    | 3.240    |
| % of sales  | 12%     | 14%     | -5%      | 0%       | 0%       | 2%       | 4%       | 10%      | 9%       | 7%       | 5%   | 10%     | 8%       | 11%      | 12%      | 13%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Financial Result and Taxes                                  |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Share of results of associated companies and joint ventures | (12)    | 29      | 18       | 11       | 12       | 12       | 22       | 9        | (26)     | (43)     |      | 4       | (39)     | 3        | 3        | 3        |
| Financial income and expenses                               | (403)   | (186)   | (287)    | (537)    | (313)    | (341)    | (164)    | (241)    | (108)    | (111)    |      | (39)    | (150)    | (269)    | (269)    | (269)    |
| Profit/(loss) before tax (EBT)                              | 999     | 1.540   | (1.369)  | (510)    | (360)    | 156      | 743      | 1.926    | 2.184    | 987      |      | 512     | 1.499    | 2.137    | 2.656    | 2.974    |
| % of sales  | 8%      | 12%     | -6%      | -2%      | -2%      | 1%       | 3%       | 9%       | 9%       | 6%       | 4%   | 9%      | 7%       | 9%       | 11%      | 12%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Income tax expense  | 1.719   | (346)   | 457      | (927)    | (189)    | (138)    | (3.256)  | (272)    | 2.026    | (273)    |      | (552)   | (825)    | (427)    | (531)    | (595)    |
| % of EBT  | -172%   | 22%     | 33%      | -182%    | -53%     | 88%      | 438%     | 14%      | -93%     | 28%      | 13%  | 108%    | 55%      | 20%      | 20%      | 20%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Profit/(loss) for the year from Continuing operations       | 2.718   | 1.194   | (912)    | (1.437)  | (549)    | 18       | (2.513)  | 1.654    | 4.210    | 714      |      | (40)    | 674      | 1.709    | 2.125    | 2.379    |
| % of sales  | 23%     | 10%     | -4%      | -6%      | -2%      | 0%       | -12%     | 7%       | 17%      | 4%       | 4%   | -1%     | 3%       | 8%       | 9%       | 10%      |
|   |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| Discontinued operations and non controlling interest        |         |         |          |          |          |          |          |          |          |          |      |         |          |          |          |          |
| (Loss)/profit for the year from Discontinued operations     | 758     | 1.274   | (15)     | (21)     | 214      | (7)      | (3)      | (9)      | 49       | (3)      |      | 8       | 5        | 0        | 0        | 0        |
| Non-controlling interests for the year                      | 14      | 2       | (161)    | 36       | 5        | 4        | 7        | 22       | 9        | 4        |      | 10      | 14       | 0        | 0        | 0        |
| Profit/(loss) for the year                                  | 3.476   | 2.468   | (927)    | (1.458)  | (335)    | 11       | (2.516)  | 1.645    | 4.259    | 711      |      | (32)    | 679      | 1.709    | 2.125    | 2.379    |
| % of sales  | 30%     | 20%     | -4%      | -6%      | -1%      | 0%       | -12%     | 7%       | 17%      | 4%       | 5%   | -1%     | 3%       | 8%       | 9%       | 10%      |



# Appendix: Operating Model II

## Balance Sheet

| Balance Sheet   |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
|---|------|--------|--------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Error Check   |      | WAHR   | WAHR   | WAHR    | WAHR    | WAHR    | WAHR    | WAHR    | WAHR   |        | WAHR   | WAHR   | WAHR   | WAHR   | WAHR   | WAHR   | WAHR   | WAHR   | WAHR |
| ASSETS  |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Non-current assets  |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Goodwill and intangible assets  | 2913 | 560    | 10.960 | 9.219   | 8.805   | 7.956   | 7.027   | 7.051   | 6.930  | 6.763  | 6.590  | 6.589  | 6.673  | 6.729  | 6.784  | 6.804  | 6.825  | 6.883  |      |
| Property, plant and equipment   | 716  | 695    | 1.981  | 1.853   | 1.790   | 1.856   | 1.783   | 1.924   | 2.015  | 1.972  | 1.951  | 2.008  | 2.066  | 2.129  | 2.198  | 2.282  | 2.382  | 2.498  |      |
| Right-of-use assets   |      | 0      | 0      | 0       | 0       | 912     | 805     | 884     | 929    | 933    | 906    | 906    | 906    | 906    | 906    | 906    | 906    | 906    |      |
| Investments in associated companies and joint ventures                  |      | 84     | 116    | 128     | 145     | 165     | 233     | 243     | 199    | 148    | 88     | 88     | 88     | 88     | 88     | 88     | 88     | 88     |      |
| Non-current financial investments                                       |      | 1.004  | 1.040  | 816     | 690     | 740     | 745     | 758     | 1.525  | 1.620  | 715    | 715    | 715    | 715    | 715    | 715    | 715    | 715    |      |
| Deferred tax assets   |      | 2.634  | 5.701  | 4.582   | 4.911   | 5.124   | 1.822   | 1.272   | 3.834  | 3.865  | 3.873  | 3.873  | 3.873  | 3.873  | 3.873  | 3.873  | 3.873  | 3.873  |      |
| Other non-current financial assets                                      |      | 49     | 254    | 215     | 373     | 445     | 306     | 325     | 252    | 246    | 1.100  | 1.100  | 1.100  | 1.100  | 1.100  | 1.100  | 1.100  | 1.100  |      |
| Defined benefit pension assets  |      | 25     | 3.802  | 3.979   | 4.224   | 4.830   | 5.038   | 7.740   | 6.754  | 6.434  | 6.258  | 6.258  | 6.258  | 6.258  | 6.258  | 6.258  | 6.258  | 6.258  |      |
| Other non-current receivables   |      | 51     | 328    | 368     | 308     | 292     | 217     | 255     | 239    | 260    | 213    | 213    | 213    | 213    | 213    | 213    | 213    | 213    |      |
| Total non-current assets  |      | 5.102  | 24.182 | 21.160  | 21.246  | 22.320  | 17.976  | 20.452  | 22.677 | 22.240 | 21.694 | 21.751 | 21.893 | 22.011 | 22.135 | 22.239 | 22.360 | 22.534 |      |
| Current assets  |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Inventories   |      | 1.014  | 2.506  | 2.646   | 3.168   | 2.936   | 2.242   | 2.392   | 3.265  | 3.291  | 2.684  | 2.742  | 2.489  | 2.297  | 2.314  | 2.370  | 2.478  | 2.644  |      |
| Trade receivables   |      | 3.913  | 6.972  | 6.880   | 4.856   | 5.025   | 5.503   | 5.382   | 5.549  | 5.729  | 4.921  | 5.304  | 5.136  | 4.989  | 4.847  | 4.767  | 4.677  | 4.814  |      |
| Contract assets   |      | 0      | 0      | –       | 1.875   | 1.489   | 1.080   | 1.146   | 1.203  | 1.126  | 1.136  | 1.136  | 1.136  | 1.136  | 1.136  | 1.136  | 1.136  | 1.136  |      |
| Other current receivables   |      | 749    | 1.296  | 1.259   | 1.024   | 908     | 850     | 859     | 934    | 873    | 764    | 764    | 764    | 764    | 764    | 764    | 764    | 764    |      |
| Current income tax assets   |      | 171    | 279    | 474     | 227     | 279     | 265     | 214     | 153    | 462    | 307    | 307    | 307    | 307    | 307    | 307    | 307    | 307    |      |
| Other current financial assets  |      | 128    | 296    | 302     | 243     | 164     | 214     | 336     | 615    | 520    | 441    | 441    | 441    | 441    | 441    | 441    | 441    | 441    |      |
| Investments at fair value through profit and loss, liquid assets        |      | 687    | 327    | 0       | 0       | 0       | 0       | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |      |
| Current financial investments   |      | 2.167  | 1.502  | 911     | 612     | 97      | 1.121   | 2.577   | 3.080  | 1.698  | 1.565  | 1.565  | 1.565  | 1.565  | 1.565  | 1.565  | 1.565  | 1.565  |      |
| Cash and cash equivalents   |      | 6.995  | 7.497  | 7.369   | 6.261   | 5.910   | 6.940   | 6.691   | 5.467  | 4.605  | 6.234  | 7.462  | 9.315  | 11.197 | 12.961 | 14.696 | 16.474 | 18.028 |      |
| Total current assets  |      | 15.824 | 20.675 | 19.841  | 18.266  | 16.808  | 18.215  | 19.597  | 20.266 | 18.304 | 18.052 | 19.722 | 21.152 | 22.696 | 24.335 | 26.046 | 27.842 | 29.699 |      |
| Assets held for sale  |      | –      | 44     | 23      | 5       | 0       | 0       | 0       | 0      | 0      | 79     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0    |
| Total assets  |      | 20.926 | 44.901 | 41.024  | 39.517  | 39.128  | 36.191  | 40.049  | 42.943 | 40.544 | 39.825 | 41.473 | 43.045 | 44.707 | 46.470 | 48.285 | 50.202 | 52.233 |      |
| SHAREHOLDERS' EQUITY AND LIABILITIES                                    |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Capital and reserves attributable to equity holders of the parent       |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Share capital   |      | 246    | 246    | 246     | 246     | 246     | 246     | 246     | 246    | 246    | 246    | 246    | 246    | 246    | 246    | 246    | 246    | 246    |      |
| Share premium   |      | 380    | 439    | 447     | 436     | 427     | 443     | 454     | 503    | 621    | 628    | 628    | 628    | 628    | 628    | 628    | 628    | 628    |      |
| Treasury shares   |      | (718)  | (881)  | (1.480) | (408)   | (352)   | (352)   | (352)   | (352)  | (606)  | (352)  | (352)  | (352)  | (352)  | (352)  | (352)  | (352)  | (352)  |      |
| Translation differences   |      | 292    | 483    | (932)   | (592)   | (372)   | (1.295) | (396)   | 169    | 238    | (249)  | (249)  | (249)  | (249)  | (249)  | (249)  | (249)  | (249)  |      |
| Fair value and other reserves   |      | 204    | 488    | 1.094   | 1.063   | 1.382   | 1.910   | 4.219   | 3.905  | 3.600  | 3.605  | 3.605  | 3.605  | 3.605  | 3.605  | 3.605  | 3.605  | 3.605  |      |
| Reserve for invested unrestricted equity                                |      | 3.820  | 15.731 | 15.616  | 15.606  | 15.607  | 15.656  | 15.726  | 15.487 | 15.521 | 15.255 | 15.255 | 15.255 | 15.255 | 15.255 | 15.255 | 15.255 | 15.255 |      |
| Accumulated deficit / Retained earnings                                 |      | 6.279  | 3.588  | 1.147   | (1.062) | (1.613) | (4.143) | (2.537) | 1.375  | 1.644  | 1.404  | 2.600  | 4.088  | 5.634  | 7.252  | 8.838  | 10.516 | 12.297 |      |
| Total capital and reserves attributable to equity holders of the parent |      | 10.503 | 20.094 | 16.138  | 15.289  | 15.325  | 12.465  | 17.360  | 21.333 | 21.265 | 20.537 | 21.733 | 23.221 | 24.767 | 26.385 | 27.971 | 29.649 | 31.430 |      |
| Non-controlling interests   |      | 21     | 881    | 80      | 82      | 76      | 80      | 102     | 93     | 86     | 91     | 91     | 91     | 91     | 91     | 91     | 91     | 91     |      |
| Total equity  |      | 10.524 | 20.975 | 16.218  | 15.371  | 15.401  | 12.545  | 17.462  | 21.426 | 21.351 | 20.628 | 21.824 | 23.312 | 24.858 | 26.476 | 28.062 | 29.740 | 31.521 |      |
| Non-current liabilities   |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Long-term interest-bearing liabilities                                  |      | 2.023  | 3.657  | 3.457   | 2.828   | 3.985   | 5.015   | 4.537   | 4.249  | 3.562  | 3.637  | 3.000  | 3.573  | 3.889  | 3.820  | 4.179  | 4.383  | 4.383  |      |
| Long-term lease liabilities   |      | 0      | 0      | 0       | 0       | 771     | 721     | 824     | 858    | 841    | 799    | 793    | 793    | 793    | 793    | 793    | 793    | 793    |      |
| Deferred tax liabilities  |      | 61     | 403    | 413     | 350     | 390     | 260     | 282     | 332    | 355    | 725    | 725    | 725    | 725    | 725    | 725    | 725    | 725    |      |
| Defined benefit pension and post-employment liabilities                 |      | 423    | 5.000  | 4.440   | 4.327   | 4.343   | 4.046   | 3.408   | 2.459  | 2.339  | 2.299  | 2.299  | 2.299  | 2.299  | 2.299  | 2.299  | 2.299  | 2.299  |      |
| Contract liabilities  |      | 0      | 0      | –       | 1.113   | 915     | 566     | 354     | 120    | 306    | 210    | 210    | 210    | 210    | 210    | 210    | 210    | 210    |      |
| Deferred revenue and other non-current liabilities                      |      | 1.254  | 1.453  | 2.986   | 852     | 712     | 541     | 436     | 103    | 79     | 111    | 111    | 111    | 111    | 111    | 111    | 111    | 111    |      |
| Provisions  |      | 250    | 808    | 766     | 572     | 556     | 736     | 645     | 622    | 565    | 518    | 518    | 518    | 518    | 518    | 518    | 518    | 518    |      |
| Total non-current liabilities   |      | 4.011  | 11.321 | 12.062  | 10.042  | 11.672  | 11.885  | 10.486  | 8.743  | 8.047  | 8.299  | 7.656  | 8.229  | 8.545  | 8.476  | 8.835  | 9.039  | 9.039  |      |
| Current liabilities   |      |        |        |         |         |         |         |         |        |        |        |        |        |        |        |        |        |        |      |
| Short-term interest-bearing liabilities                                 |      | 51     | 370    | 309     | 994     | 292     | 561     | 116     | 228    | 575    | 554    | 1.228  | 716    | 436    | 527    | 194    | 0      | 0      |      |
| Short-term lease liabilities  |      | 0      | 0      | 0       | 0       | 259     | 189     | 185     | 184    | 194    | 198    | 204    | 204    | 204    | 204    | 204    | 204    | 204    |      |
| Other financial liabilities   |      | 114    | 236    | 268     | 891     | 803     | 738     | 762     | 1.038  | 959    | 830    | 830    | 830    | 830    | 830    | 830    | 830    | 830    |      |
| Current income tax liabilities  |      | 446    | 634    | 383     | 268     | 187     | 188     | 202     | 185    | 190    | 203    | 203    | 203    | 203    | 203    | 203    | 203    | 203    |      |
| Trade payables  |      | 1.910  | 3.781  | 3.996   | 4.773   | 3.786   | 3.174   | 3.679   | 4.730  | 3.576  | 3.388  | 3.803  | 3.826  | 3.906  | 4.030  | 4.232  | 4.461  | 4.711  |      |
| Contract liabilities  |      | 0      | 0      | –       | 2.383   | 2.752   | 2.394   | 2.293   | 1.977  | 2.113  | 2.157  | 2.157  | 2.157  | 2.157  | 2.157  | 2.157  | 2.157  | 2.157  |      |
| Deferred revenue and other current liabilities                          |      | 3.395  | 6.412  | 6.666   | 3.940   | 3.323   | 3.721   | 3.940   | 3.619  | 2.848  | 2.824  | 2.824  | 2.824  | 2.824  | 2.824  | 2.824  | 2.824  | 2.824  |      |
| Provisions  |      | 475    | 1.172  | 1.122   | 855     | 653     | 796     | 924     | 813    | 690    | 744    | 744    | 744    | 744    | 744    | 744    | 744    | 744    |      |
| Total current liabilities   |      | 6.391  | 12.605 | 12.744  | 14.104  | 12.055  | 11.761  | 12.101  | 12.774 | 11.146 | 10.898 | 11.993 | 11.504 | 11.304 | 11.519 | 11.389 | 11.423 | 11.673 |      |
| Total liabilities   |      | 10.402 | 23.926 | 24.806  | 24.146  | 23.727  | 23.646  | 22.587  | 21.517 | 19.193 | 19.197 | 19.648 | 19.733 | 19.849 | 19.995 | 20.224 | 20.462 | 20.711 |      |
| Total shareholders' equity and liabilities                              |      | 20.926 | 44.901 | 41.024  | 39.517  | 39.128  | 36.191  | 40.049  | 42.943 | 40.544 | 39.825 | 41.473 | 43.045 | 44.707 | 46.470 | 48.285 | 50.202 | 52.233 |      |

# Appendix: Operating Model III

## Cash Flow Statement

### Cash Flow Statement

#### Cash flow from operating activities

|   |              |            |                |              |            |            |              |              |              |              |              |              |              |              |              |              |              |
|---|--------------|------------|----------------|--------------|------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Profit/(loss) for the year                      | 3.476        | 2.468      | (927)          | (1.458)      | (335)      | 11         | (2.516)      | 1.645        | 4.259        | 679          | 1.709        | 2.125        | 2.379        | 2.488        | 2.644        | 2.798        | 2.968        |
| Adjustments, total                              | (2.262)      | (261)      | 2.407          | 3.676        | 2.093      | 2.627      | 5.267        | 1.713        | (446)        | 2.559        | 871          | 911          | 945          | 980          | 1.009        | 1.043        | 1.091        |
| Change in net working capital (1)               |              |            |                |              |            |            |              |              |              | 0            |              |              |              |              |              |              |              |
| (Increase)/decrease in receivables              | 52           | (728)      | 18             | (421)        | 246        | 159        | (418)        | 239          | (451)        | 304          | (383)        | 169          | 147          | 142          | 80           | 91           | (137)        |
| (Increase)/decrease in inventories              | (462)        | 341        | 533            | (296)        | (544)      | 285        | 553          | (48)         | (991)        | 478          | (58)         | 254          | 191          | (17)         | (56)         | (108)        | (165)        |
| Decrease in non-interest-bearing liabilities    | 1.398        | (990)      | (2.758)        | 1.221        | (645)      | (2.232)    | (845)        | (459)        | (401)        | (2.064)      | 421          | 23           | 80           | 124          | 203          | 229          | 249          |
| Cash flows from operations                      | 2.202        | 830        | (727)          | 2.722        | 815        | 850        | 2.041        | 3.090        | 1.970        | 1.956        | 2.559        | 3.482        | 3.742        | 3.717        | 3.879        | 4.052        | 4.007        |
| Interest received                               | 45           | 62         | 85             | 53           | 68         | 57         | 33           | 41           | 65           | 178          | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Interest paid                                   | (336)        | (99)       | (309)          | (409)        | (159)      | (1)        | (35)         | (192)        | (180)        | (241)        | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Income taxes paid, net                          | (636)        | (290)      | (503)          | (555)        | (364)      | (516)      | (280)        | (314)        | (381)        | (576)        | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| <b>Net cash flows from operating activities</b> | <b>1.275</b> | <b>503</b> | <b>(1.454)</b> | <b>1.811</b> | <b>360</b> | <b>390</b> | <b>1.759</b> | <b>2.625</b> | <b>1.474</b> | <b>1.317</b> | <b>2.559</b> | <b>3.482</b> | <b>3.742</b> | <b>3.717</b> | <b>3.879</b> | <b>4.052</b> | <b>4.007</b> |

#### Cash flow from investing activities

|   |            |              |              |           |              |              |                |                |                |              |              |                |                |                |                |                |                |
|---|------------|--------------|--------------|-----------|--------------|--------------|----------------|----------------|----------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Purchase of property, plant and equipment and intangible asse     | (311)      | (314)        | (477)        | (601)     | (672)        | (690)        | (479)          | (560)          | (601)          | (652)        | (932)        | (1.057)        | (1.067)        | (1.108)        | (1.118)        | (1.168)        | (1.270)        |
| Proceeds from sale of property, plant and equipment and intan     | 44         | 28           | 67           | 88        | 39           | 13           | 103            | 33             |                | 189          | 83           | 4              | 4              | 4              | 4              | 4              | 4              |
| Acquisition of businesses, net of cash acquired                   | (175)      | (98)         | 5.819        | (394)     | (31)         | –            | (104)          | (33)           | (20)           | (19)         | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Purchase of interest-bearing financial investments                | (2.977)    | (3.133)      | (4.131)      | (2.729)   | (2.104)      | (473)        | (1.154)        | (1.845)        | (3.595)        | (1.855)      | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Purchase of investments at fair value through profit and loss, li |            | (311)        | 0            | 0         | 0            | 0            | 0              | 0              | 0              | 0            | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Proceeds from maturities and sale of interest-bearing financia    | 1.774      | 3.074        | 5.121        | 3.589     | 2.397        | 991          | 123            | 398            | 2.397          | 3.382        | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Proceeds from maturities and sale of investments at fair value    |            | 48           | 368          | 0         | 0            | 0            | 0              | 0              | 0              | 0            | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Purchase of other non-current financial investments               | (73)       | (88)         | (73)         | (104)     | (145)        | (180)        | (59)           | (77)           | (115)          | (83)         | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Proceeds from sale of other non-current financial investment      | 62         | 149          | 134          | 207       | 170          | 144          | 122            | 277            | 49             | 34           | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Proceeds from disposal of businesses, net of disposed cash(1)     | 2.508      | 2.586        | 6            | 0         | 0            | 0            | 0              | 0              | 0              | 17           | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Foreign exchange hedging of cash and cash equivalents             | 0          | 0            | 0            | 0         | 0            | 0            | 79             | (77)           | (38)           | 0            | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| Other   | 34         | (17)         | 41           | (25)      | (18)         | 2            | 21             | 19             | 10             | 30           | 0            | 0              | 0              | 0              | 0              | 0              | 0              |
| <b>Net cash flows used in investing activities</b>                | <b>886</b> | <b>1.896</b> | <b>6.836</b> | <b>10</b> | <b>(315)</b> | <b>(167)</b> | <b>(1.438)</b> | <b>(1.795)</b> | <b>(1.880)</b> | <b>1.043</b> | <b>(849)</b> | <b>(1.053)</b> | <b>(1.063)</b> | <b>(1.104)</b> | <b>(1.113)</b> | <b>(1.164)</b> | <b>(1.265)</b> |

#### Cash flow from financing activities

|   |                |              |                |                |              |              |            |                |              |                |              |              |              |              |                |                |                |
|---|----------------|--------------|----------------|----------------|--------------|--------------|------------|----------------|--------------|----------------|--------------|--------------|--------------|--------------|----------------|----------------|----------------|
| Proceeds from stock option exercises                      | 4              | 6            | 1              | –              | –            | 0            | 0          | 0              |              | 0              | 0            | 0            | 0            | 0            | 0              | 0              | 0              |
| Acquisition of treasury shares                            | (427)          | (173)        | (216)          | (785)          | –            | –            | –          | (300)          |              | (300)          | 0            | 0            | 0            | 0            | 0              | 0              | 0              |
| Purchase of equity instruments of subsidiaries            | (45)           | (52)         | (724)          | (38)           | 1            | (1)          | 0          | 0              | 0            | 0              | 0            | 0            | 0            | 0            | 0              | 0              | 0              |
| Proceeds from long-term borrowings                        | 79             | 232          | 225            | 2.129          | 139          | 1.039        | 1.595      | 17             | 8            | 496            | 773          | 1.289        | 752          | 458          | 553            | 204            | 0              |
| Repayment of long-term borrowings                         | (2.749)        | (24)         | (2.599)        | (2.041)        | (29)         | (766)        | (246)      | (927)          | (2)          | (798)          | (1.410)      | (716)        | (436)        | (527)        | (194)          | 0              | 0              |
| Proceeds from/(repayment of) short-term borrowings        | (42)           | (55)         | (100)          | (38)           | 2            | 40           | (83)       | (67)           | 27           | (40)           | 674          | (512)        | (280)        | 91           | (333)          | (194)          | 0              |
| Payment of principal portion of lease liabilities         | 0              | 0            | 0              | (7)            | (2)          | (221)        | (234)      | (226)          | (217)        | (239)          | (6)          | 0            | 0            | 0            | 0              | 0              | 0              |
| Dividends paid and other contributions to shareholders    | (1.392)        | (512)        | (1.515)        | (970)          | (1.081)      | (570)        | (149)      | (9)            | (353)        | (621)          | (513)        | (637)        | (833)        | (871)        | (1.057)        | (1.119)        | (1.187)        |
| <b>Net cash flows (used in)/from financing activities</b> | <b>(4.576)</b> | <b>(580)</b> | <b>(4.923)</b> | <b>(1.749)</b> | <b>(969)</b> | <b>(479)</b> | <b>883</b> | <b>(1.212)</b> | <b>(837)</b> | <b>(1.502)</b> | <b>(482)</b> | <b>(576)</b> | <b>(797)</b> | <b>(849)</b> | <b>(1.031)</b> | <b>(1.109)</b> | <b>(1.187)</b> |

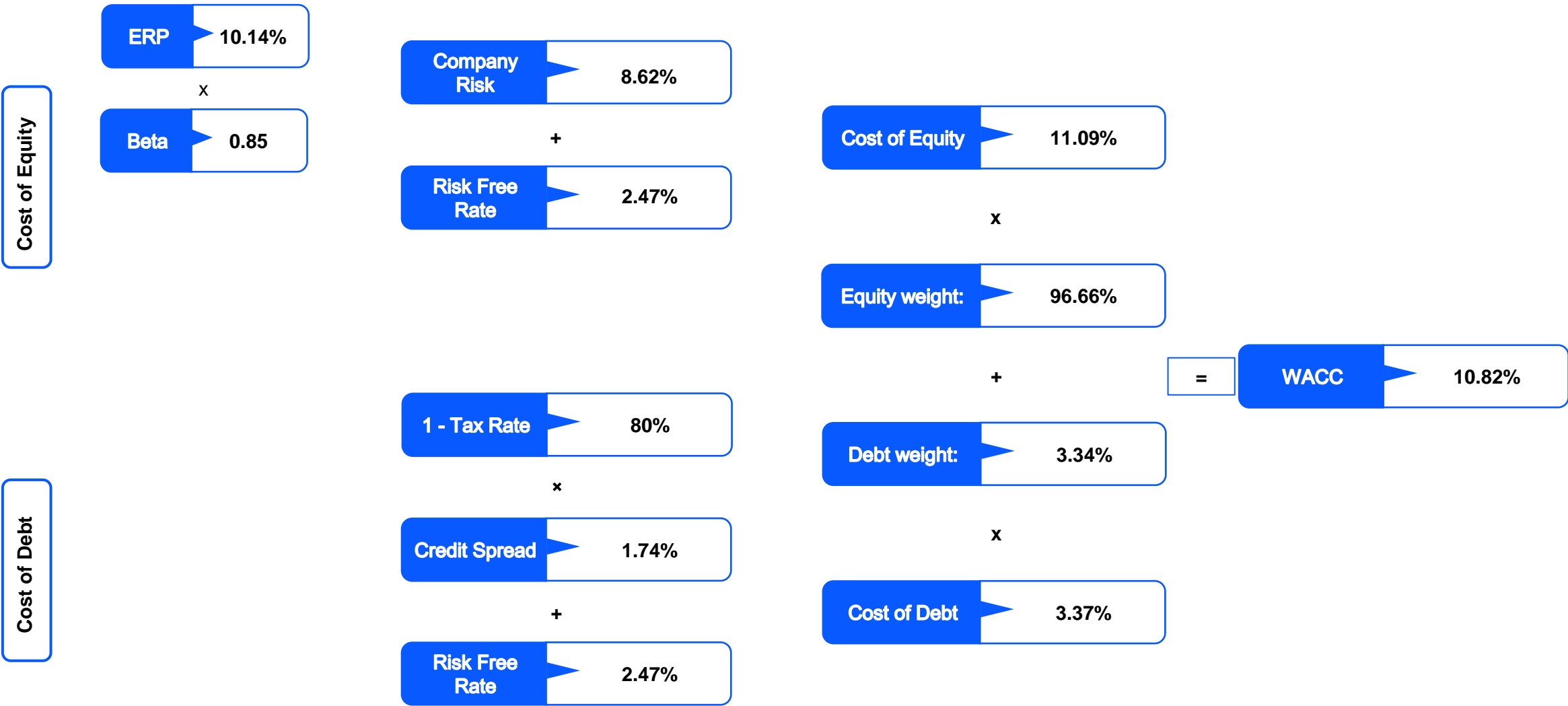
#### Total Cash Change

|   |                |              |              |              |                |              |              |              |                |              |              |              |               |               |               |               |               |
|---|----------------|--------------|--------------|--------------|----------------|--------------|--------------|--------------|----------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|
| Translation differences                                     | (48)           | 6            | 43           | (200)        | (184)          | (95)         | (174)        | 133          | 19             | (91)         | 0            | 0            | 0             | 0             | 0             | 0             | 0             |
| <b>Net (decrease)/increase in cash and cash equivalents</b> | <b>(2.463)</b> | <b>1.825</b> | <b>502</b>   | <b>(128)</b> | <b>(1.108)</b> | <b>(351)</b> | <b>1.030</b> | <b>(249)</b> | <b>(1.224)</b> | <b>767</b>   | <b>1.228</b> | <b>1.853</b> | <b>1.882</b>  | <b>1.764</b>  | <b>1.734</b>  | <b>1.779</b>  | <b>1.554</b>  |
| Cash and cash equivalents at 1 January                      | 7.633          | 5.170        | 6.995        | 7.497        | 7.369          | 6.261        | 5.910        | 6.940        | 6.691          | 5.467        | 6.234        | 7.462        | 9.315         | 11.197        | 12.961        | 14.696        | 16.474        |
| <b>Cash and cash equivalents at 31 December</b>             | <b>5.170</b>   | <b>6.995</b> | <b>7.497</b> | <b>7.369</b> | <b>6.261</b>   | <b>5.910</b> | <b>6.940</b> | <b>6.691</b> | <b>5.467</b>   | <b>6.234</b> | <b>7.462</b> | <b>9.315</b> | <b>11.197</b> | <b>12.961</b> | <b>14.696</b> | <b>16.474</b> | <b>18.028</b> |

#### Additional information

|              |     |     |       |      |       |       |     |    |    |     |     |     |     |     |     |     |     |
|--------------|-----|-----|-------|------|-------|-------|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| payout ratio | 40% | 21% | -163% | -67% | -323% | 5182% | -6% | 1% | 8% | 91% | 30% | 30% | 35% | 35% | 40% | 40% | 40% |
|--------------|-----|-----|-------|------|-------|-------|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|

WACC Tree



# Appendix: Valuation II

## DCF Valuation

### Discounted Cashflow Analysis

| Year                                    | 2023A    | 2024E    | 2025E    | 2026E    | 2027E    | 2028E    | 2029E    | 2030E    | TV     |
|---|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| t                                       | 0        | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8      |
| Revenue                                 | 22.258   | 22.778   | 23.431   | 24.279   | 25.274   | 26.771   | 28.449   | 30.292   |        |
| Cost of Sales                           | (13.571) | (13.345) | (13.557) | (13.976) | (14.563) | (15.448) | (16.448) | (17.544) |        |
| Gross Profit                            | 8.687    | 9.433    | 9.874    | 10.303   | 10.711   | 11.322   | 12.001   | 12.748   |        |
| Research and development expenses       | (4.327)  | (4.322)  | (4.445)  | (4.606)  | (4.795)  | (5.079)  | (5.397)  | (5.747)  |        |
| Selling, general and administrative exp | (2.929)  | (2.475)  | (2.266)  | (2.208)  | (2.281)  | (2.399)  | (2.549)  | (2.714)  |        |
| Other operating income and expenses     | 257      | (234)    | (240)    | (249)    | (259)    | (275)    | (292)    | (311)    |        |
| EBIT                                    | 1.688    | 2.402    | 2.922    | 3.240    | 3.376    | 3.570    | 3.763    | 3.976    |        |
| Tax expense                             | (825)    | (427)    | (531)    | (595)    | (622)    | (661)    | (699)    | (742)    |        |
| EBIAT                                   | 863      | 1.975    | 2.391    | 2.645    | 2.754    | 2.909    | 3.064    | 3.234    |        |
| + Depreciation & Amortization           | 896      | 871      | 911      | 945      | 980      | 1.009    | 1.043    | 1.091    |        |
| - CAPEX and Investments                 | (496)    | (932)    | (1.057)  | (1.067)  | (1.108)  | (1.118)  | (1.168)  | (1.270)  |        |
| +/- Change in Working Capital           | (133)    | (27)     | 446      | 418      | 249      | 226      | 211      | (53)     |        |
| Unlevered Free Cashflow                 | 1.130    | 1.887    | 2.690    | 2.940    | 2.875    | 3.027    | 3.150    | 3.003    | 32.695 |
| Discount factor                         | 1,00     | 0,89     | 0,80     | 0,71     | 0,63     | 0,56     | 0,50     | 0,45     | 0,40   |
| Present Value of FCF                    | 1.130    | 1.683    | 2.140    | 2.085    | 1.818    | 1.707    | 1.584    | 1.347    | 13.078 |

| DCF Output                        |        |
|-----------------------------------|--------|
| Present value of future cashflows | 12.364 |
| Present value of terminal value   | 13.078 |
| Enterprise Value                  | 25.442 |
| - Interest bearing debt           | 4.137  |
| - Leases                          | 1.035  |
| - Minority Interest               | 86     |
| + Cash & Cash Equivalents         | 4.605  |
| Equity Value                      | 24.789 |

| Target Share Price  |        |
|---------------------|--------|
| Equity Value        | 24.789 |
| Shares out.         | 5.538  |
| Target Share Price  | 4,48   |
| Target Share Price  | 1,08   |
| Target Share Price  | 4,84   |
| Target Share Price  | 4,84   |
| Current share Price | 3,61   |
| Upside/Downside     | 33,99% |

| Assumptions               |        |
|---------------------------|--------|
| WACC (forecasting period) | 10,82% |
| WACC (Terminal Value)     | 10,82% |
| Perpetuity Growth Rate    | 1,50%  |

| Capital Structure     |        |
|-----------------------|--------|
| Market Capitalization | 18.356 |
| Net Debt              | 653    |
| D/D+E                 | 3,44%  |
| E/E+D                 | 96,56% |

| Scenarios  |           |
|------------|-----------|
| Input Case | Base Case |

| Growth Rate | WACC  |        |        |        |        |        |
|-------------|-------|--------|--------|--------|--------|--------|
|             |       | 8.82%  | 9.82%  | 10.82% | 11.82% | 12.82% |
|             | 1.00% | \$6.11 | \$5.32 | \$4.69 | \$4.18 | \$3.76 |
|             | 1.25% | \$6.24 | \$5.41 | \$4.76 | \$4.23 | \$3.80 |
|             | 1.50% | \$6.38 | \$5.51 | \$4.83 | \$4.29 | \$3.84 |
|             | 1.75% | \$6.52 | \$5.62 | \$4.91 | \$4.35 | \$3.88 |
|             | 2.00% | \$6.68 | \$5.73 | \$4.99 | \$4.41 | \$3.93 |