

As filed with the Securities and Exchange Commission on 2 March 2023

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 20-F

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended 31 December 2022

Commission file number 1-13202

Nokia Corporation

(Exact name of Registrant as specified in its charter)

Republic of Finland

(Jurisdiction of incorporation)

Karakaari 7 FI-02610 Espoo, Finland

(Address of principal executive offices)

Esa Niinimäki, Chief Legal Officer, Telephone: +358 (0) 10 44 88 000, Facsimile: +358 (0) 10 44 81 002,

Karakaari 7, FI-02610 Espoo, Finland

(Name, Telephone, E-mail and/or Facsimile number and Address of Company Contact Person)

Securities registered pursuant to Section 12(b) of the Securities Exchange Act of 1934 (the "Exchange Act"):

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
American Depositary Shares	NOK	New York Stock Exchange
Shares		New York Stock Exchange ⁽¹⁾

(1) Not for trading, but only in connection with the registration of American Depositary Shares representing these shares, pursuant to the requirements of the Securities and Exchange Commission.

Securities registered pursuant to Section 12(g) of the Exchange Act: **None**

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Exchange Act: **None**

Indicate the number of outstanding shares of each of the registrant's classes of capital or common stock as of the close of the period covered by the annual report. Shares: 5 632 297 576.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ No ☐

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Exchange Act.

Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Exchange Act during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" or "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒

Accelerated filer ☐

Non-accelerated filer ☐

Smaller reporting company ☐

Emerging growth company ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP ☐

International Financial Reporting Standards as issued by the International Accounting Standards Board ☒

Other ☐

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 ☐ Item 18 ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

Cross-reference table to Form 20-F

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Forward-looking statements

Certain statements contained in this report constitute "forward-looking statements." Forward-looking statements provide Nokia's current expectations of future events and trends based on certain assumptions and include any statement that does not directly relate to any current or historical fact. The words "believe," "expect," "expectations," "anticipate," "foresee," "see," "target," "estimate," "designed," "aim," "plan," "intend," "influence," "assumption," "focus," "continue," "project," "should," "is to," "will," "strive," "may" or similar expressions as they relate to us or our management are intended to identify these forward-looking statements, as well as statements regarding:

- A) business strategies, market expansion, growth management, and future industry trends and megatrends and our plans to address them;
- B) future performance of our businesses and any future distributions and dividends;
- C) expectations and targets regarding financial performance, results, operating expenses, cash flows, taxes, currency exchange rates, hedging, cost savings and competitiveness, as well as results of operations including targeted synergies and those related to market share, prices, net sales, income and margins;
- D) expectations, plans, timelines or benefits related to changes in our organizational and operational structure;
- E) market developments in our current and future markets and their seasonality and cyclicality, including the communications service provider market, as well as general economic conditions, future regulatory developments and the expected impact, timing and duration of the COVID-19 pandemic on our businesses, our supply chain, our customers' businesses and the general market and economic conditions;
- F) our position in the market, including product portfolio and geographical reach, and our ability to use the same to develop the relevant business or market and maintain our order pipeline over time;
- G) any future collaboration or business collaboration agreements or patent license agreements or arbitration awards, including income from any collaboration or partnership, agreement or award;
- H) timing of the development and delivery of our products and services;
- I) the outcome of pending and threatened litigation, arbitration, disputes, regulatory proceedings or investigations by authorities;
- J) restructurings, investments, capital structure optimization efforts, divestments and our ability to achieve the financial and operational targets set in connection with any such restructurings, investments, and capital structure optimization efforts including our ongoing cost savings program;
- K) future capital expenditures, temporary incremental expenditures or other R&D expenditures to develop or rollout new products; and
- L) the sustainability and corporate responsibility.

These statements are based on management's best assumptions and beliefs in light of the information currently available to it and are subject to a number of risks and uncertainties, many of which are beyond our control, which could cause actual results to differ materially from such statements. These statements are only predictions based upon our current expectations and views of future events and developments and are subject to risks and uncertainties that are difficult to predict because they relate to events and depend on circumstances that will occur in the future. Risks and uncertainties that could affect these statements include but are not limited to the risk factors specified under the section "Risk factors" of this report and in our other filings or documents furnished with the U.S. Securities and Exchange Commission. Other unknown or unpredictable factors or underlying assumptions subsequently proven to be incorrect could cause actual results to differ materially from those in the forward-looking statements. We do not undertake any obligation to publicly update or revise forward-looking statements, whether as a result of new information, future events or otherwise, except to the extent legally required.

Introduction and use of certain terms

Nokia Corporation is a public limited liability company incorporated under the laws of the Republic of Finland and registered to the Finnish Trade Register since 1896. In this Annual Report on Form 20-F, any reference to “we,” “us,” “the Group,” “the company” or “Nokia” means Nokia Corporation and its consolidated subsidiaries and generally Nokia’s continuing operations, except where we separately specify that the term means Nokia Corporation or a particular subsidiary or business segment only or our discontinued operations. References to “our shares,” matters relating to our shares or matters of corporate governance refer to the shares and corporate governance of Nokia Corporation.

Nokia Corporation has published its consolidated financial statements in euro for periods beginning on or after 1 January 1999. In this Annual Report on Form 20-F, references to “EUR,” “euro” or “€” are to the common currency of the European Economic and Monetary Union, references to “dollars,” “US dollars,” “USD” or “\$” are to the currency of the United States, and references to “Chinese yuan” or “Chinese yuan renminbi” or “CNY” are to the official currency of the People’s Republic of China.

Additional terms are defined in the “Glossary.”

The information contained in, or accessible through, the websites linked throughout this Annual Report on Form 20-F is not incorporated by reference into this document and should not be considered a part of this document.

Nokia Corporation furnishes Citibank, N.A., as Depositary, with its consolidated financial statements and a related audit opinion of our independent auditors annually. These financial statements are prepared on the basis of International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board and in conformity with IFRS as adopted by the European Union. In accordance with the rules and regulations of the SEC, we do not provide a reconciliation of our consolidated financial statements to the generally accepted accounting principles in the US, or US GAAP. We also furnish the Depositary with quarterly reports containing unaudited financial information prepared on the basis of IFRS, as well as all notices of shareholders’ meetings and other reports and communications that are made available generally to our shareholders. The Depositary makes these notices, reports and communications available for inspection by record holders of American Depositary Receipts (ADRs), evidencing American Depositary Shares (ADSs), and distributes to all record holders of ADR notices of shareholders’ meetings received by the Depositary.

In addition to the materials delivered to holders of ADRs by the Depositary, holders can access our consolidated financial statements, and other information included in our annual reports and proxy materials, at nokia.com/financials. This Annual Report on Form 20-F is also available at nokia.com/financials as well as on Citibank’s website at <https://app.irdirect.net/company/49733/hotline/>. Holders may also request a hard copy of this annual report by calling the toll-free number 1-877-NOKIA-ADR (1-877-665-4223), or by directing a written request to Citibank, N.A., Shareholder Services, PO Box 43077, Providence, RI 02940-3081, United States. With each annual distribution of our proxy materials, we offer our record holders of ADRs the option of receiving all of these documents electronically in the future.

Nokia Annual Report on Form 20-F 2022

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Business overview

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The platform for our future

The Nokia platform guides everything we do across our global organization. Its three elements shape our ambition, our strategy and our culture.

Our purpose

At Nokia, we create technology that helps the world act together.

While our lives may be getting longer, healthier and richer, the world is facing fundamental challenges: Productivity is stalling, pressure on the planet is increasing and access to opportunity remains stubbornly unequal.

Digitalization is central to the solution.

We see the potential of digital to transform business, industry and society. When the world's organizations, machines and devices are in sync with each other and the people they serve, a new capability unfolds to create a more productive, sustainable and accessible future.

Our commitment

We are delivering the next evolution in critical networking through technology leadership and trusted partnerships.

We are meeting the new demands placed on networks through the next evolution of networking where networks meet cloud with 'networks that sense, think and act'.

These networks go beyond connecting people and things, bits and bytes. They're adaptable, autonomous, and consumable. They're alive with intelligence and enable people, machines and devices to interact in real time, like never before.

Critically, 'networks that sense, think and act' are creating new opportunities for our customers and partners, both existing and new, to access and harness the full power of networking like never before. How?

- By 'sensing' and understanding human and machine parameters using next generation mobile and optical technologies
- By 'thinking' of actions before a fault occurs in the network or in an enterprise using next generation analytics and AI
- By 'acting' to connect humans and machines alike by enabling wide area or local area networks.

Essentials

Our essentials highlight the culture we are creating for our people, customers and partners.

As we seek to realize the full potential of digital in every industry, acting as a collaborative partner to our customers and pioneering the next evolution of networks, we are creating the culture needed to drive the future growth of Nokia.

- **Open** - in mindset, to opportunity, through/with transparency
- **Fearless** - bringing authenticity, sharing ideas and opinions, embracing collaboration
- **Empowered** - to make decisions, to act with clear accountability.

Helping the world act together

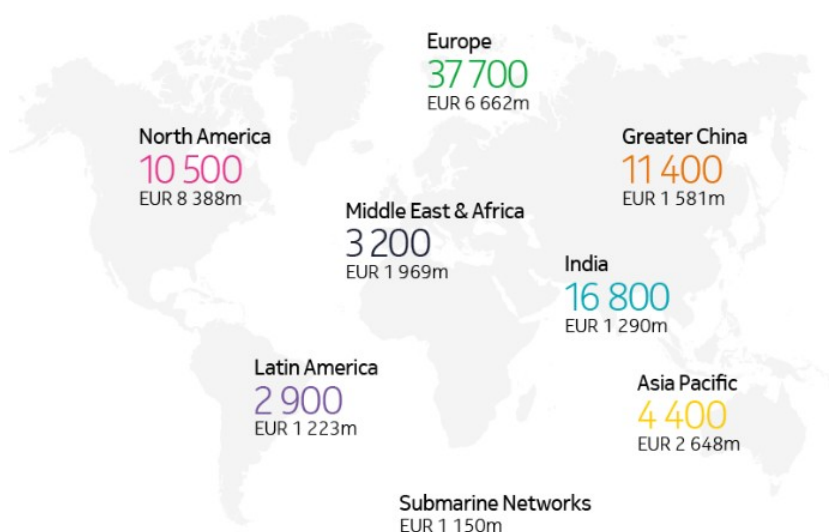
At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

Our products, solutions and services can drive social, environmental, and economic progress. Digitalization and connectivity can have a critical role in solving some of the world's greatest challenges including stalled productivity, climate change and unequal access to opportunity. Our products and solutions bring digitalization to physical industries and cities, helping them decarbonize and increase efficiency, productivity and safety.

Regional split of employees and net sales⁽¹⁾



(1) Regional net sales figures exclude net sales of Submarine Networks business.

Global reach

Our technology solutions enable critical networks for communications service providers (CSPs) and enterprises around the world.

Net sales in 2022

EUR 24.9bn

Countries of operation

~130

Average number of employees in 2022

~86 900

Financial Highlights

	2022	2021	2020
For the year ended 31 December, Continuing operations	EURm	EURm	EURm
Net sales	24 911	22 202	21 852
Gross profit	10 222	8 834	8 193
Gross margin	41.0%	39.8%	37.5%
Operating profit	2 318	2 158	885
Operating margin	9.3%	9.7%	4.0%
Profit/(loss) for the year	4 210	1 654	(2 513)
	EUR	EUR	EUR
Earnings per share, diluted	0.74	0.29	(0.45)
Proposed dividend per share ⁽¹⁾	0.12	0.08	0.00
	EURm	EURm	EURm
31 December			
Net cash and interest-bearing financial investments ⁽²⁾	4 767	4 615	2 485

(1) The Board of Directors proposes to the Annual General Meeting to be authorized to decide in its discretion on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity.

(2) Non-IFRS measure. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

Shareholder distributions

Dividend per share proposed in respect of 2022⁽¹⁾

EUR 0.12

Ongoing share buyback program announced in 2022

EUR 600m

over 2 years

(1) The Board of Directors proposes to the Annual General Meeting to be authorized to decide in its discretion on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity.

Strengthening our technology leadership

R&D investment since 2000

EUR 140bn+

Patent families declared as essential to 5G

4 500+

Nobel Prizes awarded for ground-breaking achievements in global innovation

9

Promoting freedom of expression and privacy

In 2022, we completed our second independent Global Network Initiative (GNI) assessment. GNI Participants commit to implementing the organization's Principles on Freedom of Expression and Privacy, providing direction and guidance to the ICT industry and its stakeholders on advancing human rights.

Refer to the "Sustainability and Corporate Responsibility" section for more information on our sustainability and corporate responsibility work.

At the beginning of 2022, we joined the RE100 initiative to help further solidify our work towards 100% renewable electricity across our facilities by 2025.

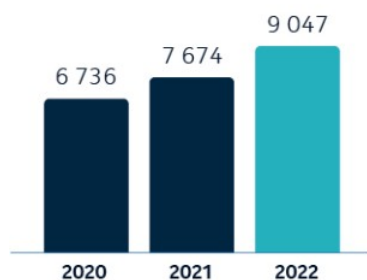
Our business groups

Nokia has four business groups with each business group aiming to become a technology and market leader in their respective sector.

Network Infrastructure

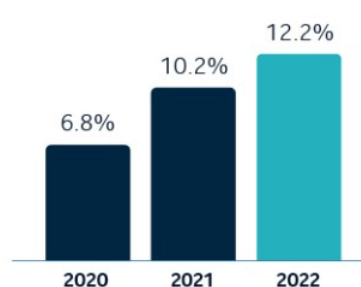
Network Infrastructure provides fiber, fixed wireless access technologies, copper, IP routing, data center, subsea and terrestrial optical networks – along with related services – to customers including communications service providers, webscales (including hyperscalers), digital industries and governments.

Segment net sales (EURm)



+18%

Segment operating margin (%)



+200 bps

Mobile Networks

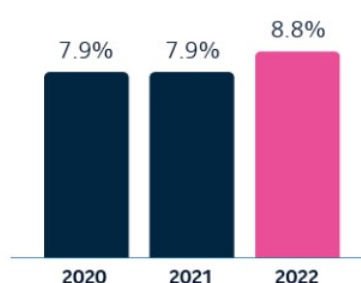
Mobile Networks creates products and services covering all network generations. Its portfolio includes products for radio access networks (RAN) and microwave radio links for transport networks, solutions for network management as well as network planning, optimization, network deployment and technical support services.

Segment net sales (EURm)



+10%

Segment operating margin (%)

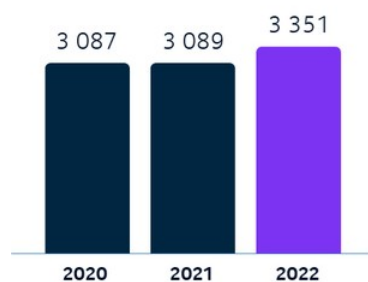


+90 bps

Cloud and Network Services

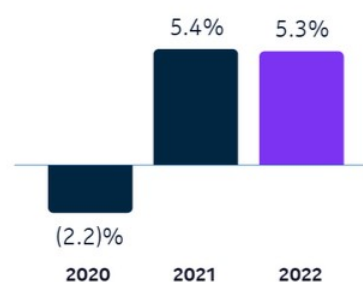
Cloud and Network Services enables CSPs and enterprises to deploy and monetize 5G, cloud-native software and as-a-Service delivery models.

Segment net sales (EURm)



+8%

Segment operating margin (%)

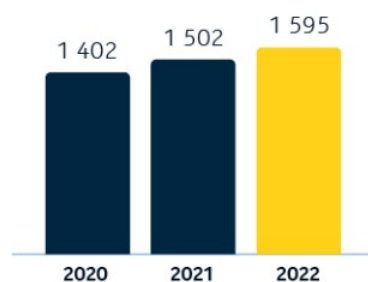


-10 bps

Nokia Technologies

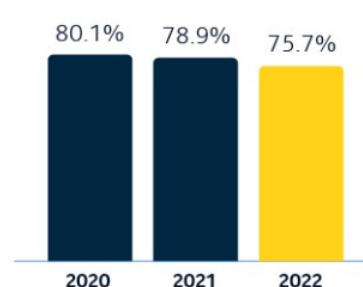
Nokia Technologies is responsible for managing Nokia's patent portfolio and monetizing Nokia's intellectual property including patents, technologies and the Nokia brand.

Segment net sales (EURm)



+6%

Segment operating margin (%)



-320 bps

Letter from our President and CEO

“All four of our empowered and accountable business groups showed signs of acceleration this year, helping Nokia take another step towards our long-term target of growing faster than the market with a comparable operating margin of at least 14%.⁽¹⁾”

Pekka Lundmark, President and CEO

A year of acceleration

We said at the start of 2022 that it would be a year of acceleration, and I am pleased that we delivered what we promised. The Nokia team did a great job navigating geopolitical, economic and supply challenges, successfully executed our strategy and delivered a strong full-year performance. As a result, we achieved another year of solid growth while maintaining good profitability.

The reset we completed in 2021 meant we began the year on a much stronger footing for the second phase of our three-part plan to reset, accelerate and scale our business with the aim of ensuring sustainable, profitable growth. The focus on strengthening our technology leadership and increasing our competitiveness helped us gain market share in many areas including new customer wins in rapidly growing markets like India.

One of our strategic priorities for 2022, and beyond, was to broaden our customer base and grow in Enterprise. I was delighted that we delivered on this aspiration with strong Enterprise net sales growth. Importantly we also achieved significant webscale customer wins and momentum continues to build in private wireless, where we had more than 560 customers at the end of 2022.

Our technology leadership was evident in many other areas, including IP Networks, where we started to deploy 800 Gigabit Ethernet (800GE) routing to give operators more capacity and greater energy efficiency. We also launched Nokia Lightspan MF-14, the world's most advanced fiber platform, and carried out the first 100G passive optical network (PON) broadband demonstration in the US. Together with our partners, we set new records in 5G carrier aggregation and launched the world's first commercial 5G standalone network with network slicing for Fixed Wireless Access services. We also launched the first complete 5G core solution in the Software-as-a-Service (SaaS) delivery model.

Nokia continued to invest in research and development and to ensure our technology leadership for the future. Construction work got underway on a new campus in Oulu, Finland, encompassing new facilities for R&D, manufacturing and office space, and we announced an ambitious redevelopment of our Ottawa campus, in Canada, to create a center of excellence for 5G, cybersecurity, AI and machine learning research.

This year was not without its challenges. Nokia strongly condemned the Russian invasion of Ukraine, and I am proud of our Ukrainian employees, who are bravely helping maintain customer networks and provide critical connectivity. It became clear in the early days of the invasion that our continued presence in Russia would no longer be possible, so we took the decision to exit the Russian market.

Progress across our business groups

All four of our empowered and accountable business groups showed signs of acceleration this year, helping Nokia take another step towards our long-term target of growing faster than the market with a comparable operating margin of at least 14%⁽¹⁾.

Network Infrastructure had another year of strong growth, with all four of its business divisions contributing, and significant operating margin expansion. Clear technology leadership across the portfolio and continued strong demand for fiber were the biggest drivers. We have now reached more than 100 customers for PSE-V, our advanced coherent optical solution, and more than 30 customers for our FP5 chipset.

Mobile Networks delivered on its ambition to return to growth in 2022 and improved profitability over the full year, driven by increased portfolio competitiveness and strong demand. We continued to win new 5G business and our ReefShark system-on-chip portfolio accounted for 97% of shipments by the end of the year, hitting the target of around 100%.

Cloud and Network Services grew its top line as it continued to make progress refocusing investments and rebalancing the portfolio. The launch of Nokia Cloud Native Communication Suite, giving customers greater energy efficiency, was a highlight. CNS also created a new business unit, focused on improving the returns on our customers' network investment, launched several SaaS services, and expanded our campus private wireless leadership while targeting broader Enterprise Campus Edge opportunities.

Nokia Technologies continued to make good progress in growth areas with new licensing agreements in the automotive, consumer electronics and Internet of Things (IoT) sectors. We also continued to strengthen our portfolio, filing patents on over 1 700 new inventions last year and reaching over 4 500 patent families declared as essential to 5G.

Purpose drives our success

In 2021 we introduced our new purpose—At Nokia, we create technology that helps the world act together. To ensure we achieve our company purpose, in 2022 we announced a Technology Strategy and a new Environmental, Social and Governance (ESG) Strategy to drive closer alignment of product development across our business with the aim of making ESG a competitive advantage for Nokia.

Technology Strategy

This strategy has seven pillars and has evolved out of our Technology Vision 2030, which identified the need for advanced networks and an ecosystem of partners to realize the potential of digitalization and the three main metaverses (Consumer, Enterprise and Industrial) we believe will emerge by the end of the decade.

The seven technology pillars for Nokia's differentiation are: innovation, sustainability, semiconductors, security, artificial intelligence, software and consumability.

Environmental, Social and Governance (ESG) Strategy

This strategy has five focus areas to ensure that sustainability is a fundamental part of how Nokia develops technology and makes business decisions.

The five ESG focus areas are: the environment, industrial digitalization, security and privacy, bridging the digital divide and responsible business.

People at the heart of our organization

In collaboration with our employees, we also created a new Nokia People Strategy to guide our daily work with the intention of putting our people at the heart of everything we do. Our goal is to create an environment in which all our people can thrive so that we can deliver on our purpose. We believe this approach will also help us attract, retain and develop the best talent.

Renewing our brand and strategy update

We recognized that we needed to refresh Nokia's brand to reflect who we are today. In 2022 we began work on renewing our brand, and updating our strategy, to help reframe how customers, partners, stakeholders and current and potential employees perceive Nokia with the aim of asserting our leadership in networking technology when we launched our refreshed brand in early 2023.

Looking ahead

There were a number of challenges we had to overcome throughout the year, but I'm delighted we still managed to accelerate our performance and demonstrate the resilience of our business. Thanks to the team, we ended the year in a much stronger position and firmly on track to achieve our long-term business objectives. I firmly believe consistent execution and progressing towards our long-term targets will also enable us to deliver what is our ultimate objective – creating value for our shareholders.

Pekka Lundmark
President and CEO

“In collaboration with our employees, we also created a new Nokia People Strategy to guide our daily work with the intention of putting our people at the heart of everything we do. Our goal is to create an environment in which all our people can thrive so that we can deliver on our purpose.”

Momentum continues to build in private wireless, where at the end of 2022 we had

560+ customers

For PSE-V, our advanced coherent optical solution, we have now reached

100+ customers

and for our FP5 chipset

30+ customers

(1) Non-IFRS measure. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

Our customers

We serve three customer segments: communications service providers, enterprises and licensees.

Networks play an increasingly important role in the economy and in society. As a result, we serve a growing number of customers who provide critical services to end-users. We distinguish three customer segments that we serve with our hardware, software and services portfolio: Communications services providers and enterprises, therein enterprise verticals and webscalers. In addition, we license our intellectual property to selected industries that benefit from our innovations, primarily in the mobile devices, automotive, consumer electronics and IoT industries.

Our analysis of the evolution of these segments is set out below.

1. Communications service providers (CSPs)

The CSPs estimated total addressable market (TAM) grew by 5% to EUR 110 billion from 2021 to 2022.

A communications service provider offers telecommunications services such as voice and/or data services through fixed and/or mobile connectivity to consumers, enterprises, governments and other communications service providers. Nokia maintains a consolidated view of the Nokia total addressable market based on multiple external analyst reports, customer and key competitor reported and announced insights as well as Nokia internal insights. We estimate the CSPs estimated total addressable market for Nokia grew by 5% to EUR 110 billion from 2021 to 2022. We expect it to only grow moderately, at a 1% compound annual growth rate (CAGR) between 2022-27. We expect the CSP radio access network (RAN) market outside China to continue to grow through 2023, and the declining investments in LTE and 2G/3G to start to offset 5G growth afterwards, resulting in flat outlook after 2023 through to 2027. We expect that fixed wireless access, fiber, IP routing and optical networks grow faster than the overall CSP market, driven by the continuous demand for higher speed access technologies at homes and workplaces. The 5G cycle will also yield growth in software, namely in 5G Core and in all software segments supporting 5G operability and monetization.

CSPs have kept their capital expenditure intensity flat, but increased their earnings through automation, digitalization, shifts in channel mix, outsourcing and asset sales. We expect them to remain focused on the monetization of their connectivity strengths, and on cost optimization. They are also considering divesting from passive infrastructure and transitioning towards network sharing models. In areas in which the network is built for coverage, this might reduce demand for network vendor equipment. We have also seen the first examples of CSPs relying on webscalers to lead the transition to cloud-based operational and business models. When combined with open RAN standards that aim at splitting a base transceiver station into subcomponents with open interfaces, this may allow for new entrants into the market and increase competition. Conversely, it should also serve to accelerate innovation and create opportunities for market share gains for those investing in the technology.

Geopolitics and environmental criteria increasingly influence investment and vendor decisions. Security and sovereignty have become important factors across the vendor landscape. Government-funded broadband initiatives also provide additional funding for investments, for example in rural areas. Sustainability considerations such as green energy use, energy consumption reduction plans and circular economy approaches also shift the criteria for vendor selection.

2. Enterprises

Enterprise estimated TAM grew by 12% to EUR 16 billion from 2021 to 2022.

Enterprise TAM includes enterprise verticals and webscaler markets. The estimated enterprise TAM grew by 12% to EUR 16 billion from 2021 to 2022. We forecast this market to grow strongly, at 8% CAGR until 2027, with the private wireless market reaching 27% CAGR.

Enterprise verticals

An enterprise vertical represents a grouping of companies by an industry that offers products and services that meet specific needs. We primarily focus on transportation and logistics, energy, manufacturing, and public sector verticals. This reflects our assessment that these are seeing the most significant digitalization over the coming years, as they automate many aspects of their operations. We project that growth will mainly be driven by private wireless and wireline networks in manufacturing, as well as in the public sector and in energy. We estimate that IP routing and optical networks will also continue to grow moderately in these segments.

Webscalers

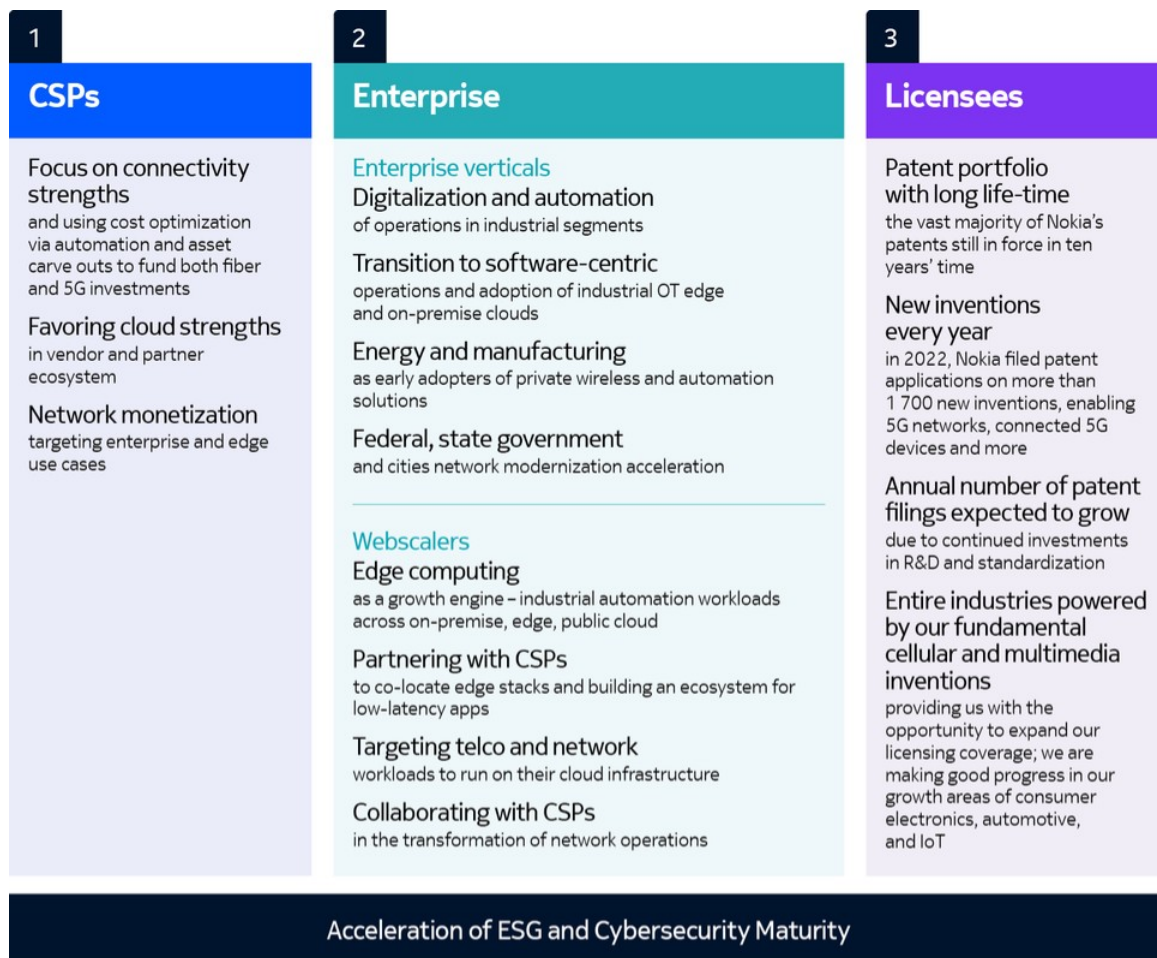
Webscaler refers to companies that provide cloud-based solutions and services. Alphabet (Google Cloud Platform), Amazon (Amazon Web Services) and Microsoft (Azure) are the largest cloud players – also referred to as hyperscalers – operating on a global scale. Our TAM for webscalers consists mainly of optical networks and IP routing. Within optical networks, we expect that data center interconnect (DCI) will be a strong growth driver, while the increasing webscaler data traffic requires adoption of higher bit rate technologies also in IP routing.

The largest, global webscalers are also assuming an increasingly important role within the telecommunication domain. They target edge computing as the next growth engine for industrial automation workloads and low-latency applications. They also partner with CSPs to co-locate edge stacks on-premises and at metro sites. Additionally, they aim to run telecommunication network workloads on their cloud infrastructure. As such, webscalers are customers and potential partners, as well as potential competitors in some areas.

3. Licensees

Licensees refers to companies who have agreed licenses to use Nokia's intellectual property. This includes the licensing of Nokia's patent portfolio, the licensing of technologies for integration into consumer devices and licensing of the Nokia brand. The majority of Nokia Technologies' revenues

comes from patent licensing where we have agreements with most major smartphone vendors as well as licensing programs for consumer electronics, video services, automotive and the wider IoT domain. In total, we have more than 200 licensees across all our programs, including companies like Samsung, Lenovo, and Volkswagen.



Our strategy

Networks are the key enabler for the digitalization of industries and the realization of the broader potential of the metaverse. As a result, we see opportunity to grow our business, expand into adjacencies and transform our business model.

In 2021, Nokia set out its strategy to deliver sustainable, profitable growth by becoming a B2B technology innovation leader, accompanied by a new purpose and operating model. We set out actions to reset, accelerate, and then scale our business to lead in a world where widespread digitalization is gathering speed.

And as enterprises, webscalers and governments digitalize, they increasingly need the essential networking technology Nokia provides to succeed. Networks are critical to unlocking the enormous opportunities across industrial, enterprise and consumer spheres, as we outlined in our Technology Vision 2030.

As we move from the 5G era towards 5G-Advanced and 6G, the underlying networks will need to evolve. The networks of the next decade will need to meet the demands of fully immersive augmented and virtual reality, digital twins, and biosensors. These technologies will in turn unleash the full promise of the consumer, enterprise and industrial metaverses, which until now have only shown a glimpse of their potential. They will pave the way for true extended reality (XR) experiences, which will eventually lead to the merging of the physical and digital worlds and the enhancement of humans.

Early metaverse applications are already visible in industries which use digital twins, where significant uplifts in productivity, sustainability and worker safety have been achieved. We have helped to pioneer these advances by collaborating with customers and partners.

The successful and rapid deployment of these technologies will require a fundamental shift in connectivity.

We are embracing this opportunity to pioneer the next evolution of networking, where networks meet cloud.

Our strategy

To reinforce our position as a leader and enabler of digitalization, we are confidently asserting the value we bring:

- **Networking expertise:** We know that accelerating the digital transformation of every industry will be critical to unlocking massive gains in sustainability, productivity, and accessibility – our networking expertise is increasingly valuable to customers and partners as they seek to maximize their growth.
- **Technology leadership:** We are specialists in the technology we deliver – with a laser-focus on delivering a best of breed technology portfolio.
- **Pioneering innovation:** Innovation runs through our business – across our evolving portfolio, in the disruptive research and game-changing programs at Nokia Bell Labs, in our work to build the device and application ecosystems needed for digitalization, and through our innovation programs where we bring emerging technology to life alongside our partners.
- **Collaborative advantage:** Collaboration is in our DNA, and we are valued for the trusted relationships we build with our customers. Today, we are going further: we know that realizing the potential of digital cannot be achieved alone, so we are focused on bringing the right partners and technologies together to create the digital services and applications of the future.

Our strategy consists of six pillars – key objectives that will define our success – and four enablers to help us get there.

The six pillars are:

1. Grow CSP business faster than market

CSPs will continue to be our main customer segment. We will leverage our strong technological position, investment in technology leadership and emerging opportunities to grow our share in key markets, with geopolitical considerations supporting this ambition.

2. Expand the share of enterprise in our business

Enterprise verticals and web-scalers are deploying campus networks, wide area private wireless networks, enterprise physical networks, and data centers at an accelerated rate to digitalize their operations. Being a technology leader in all these domains, we pursue these opportunities to grow our enterprise business.

3. Actively manage our portfolio

Maintaining our portfolio segments at number one or number two position, through several routes including active portfolio management, is critical for a profitable and sustainable business. There may be cases where a leadership position is not possible and for these cases, we will consider alternatives.

4. Secure business longevity in Nokia Technologies

We are investing to ensure the sustained competitiveness of our patent portfolio. We will continue to pursue opportunities from sectors outside mobile devices, such as automotive, consumer electronics, IoT and video services.

5. Build new business models

To broaden our customer base and change our margin profile, we see potential in new platform business models within the broader ecosystem. We engage with service providers, web-scalers, industrial giants and emerging players like app developers and start-ups, to drive the creation of new products, services, and solutions, and to explore new business models including CloudRAN, Network as Code and as-a-Service.

6. Develop ESG into a competitive advantage

ESG is increasingly important for customers, investors, regulators, partners, and Nokia employees. There is space in our industry to become the 'trusted provider' and Nokia aims to claim this position. Our ESG strategy lays out how we will do this and our specific areas of focus.

The six pillars are underpinned by four enablers:

1. Develop future-fit-talent

We have launched and are executing a new people strategy focused on growth, skills, and development. We build the right future skills for our employees in the technical domains identified in our technology vision and strategy, and the commercial skills to support our expansion into new domains.

2. Invest in long-term research

Sustained technology leadership is a key driver of our success: it requires us to anticipate, shape, and invest in the next technology waves and breakthroughs. We continue to invest in long-term research to ensure a leadership position in line with our Technology Vision 2030. We are also deeply engaged in leading and influencing standards and developing standard essential patents.

3. Digitalize our own operations

We are increasing the digitalization of our own operations to lead by example with a set of ambitious, company-wide strategic initiatives to increase the company's performance and competitiveness, focused on efficiency, productivity and agility in internal operations, customer experience and R&D.

4. Refresh our brand

With Nokia accelerating into the next phase of our growth strategy, we have refreshed our brand to reflect the focus of Nokia's business as a B2B technology innovation leader. Our new visual identity is emblematic of an energized, dynamic and modern Nokia.

Our path to continued technology leadership

As one of the industry's leading investors in communication technology research and development (R&D), we drive innovation across a comprehensive portfolio of network equipment, software, services and licensing opportunities.

Nokia's world-leading research and development

We have a global network of R&D centers, each with specialties and ecosystems built around both competence and technologies. Most of our R&D is conducted within the business group structures, and is further elaborated in the Business Group specific sections of this report.

Laying the path for Nokia's future technology innovation and identifying the most promising areas for new value creation

While our business groups focus on near- to mid-term innovation, Nokia's dedicated Strategy and Technology (S&T) organization is focused on longer-term technology cycles. S&T is responsible for developing a coherent corporate strategy and technology and architecture vision across the company, as well as implementing it in partnership with Nokia's business groups. S&T drives company-wide internal technology alignment, and by transferring technologies to the business groups, it evolves the company's technology portfolio to enable Nokia's continued technology leadership.

Nokia Bell Labs continues its long-standing tradition of disruptive innovation within the fundamental technologies that underpin communications networks and systems. A key part of its mandate is to also explore concepts that generate growth opportunities in adjacent and emerging markets. Nokia has pioneered many of the foundational technologies of the 5G era. Now, our research is actively focusing on the future beyond 5G, so that we are firmly positioned to continue our leading role.



Nokia is investing to lead in the 5G-Advanced networks that are anticipated to begin appearing in 2025, while also already actively preparing for leadership in the 6G era. Hexa-X II, the second phase of the European Commission's flagship 6G initiative for research into the next generation of wireless networks, was announced in October 2022 with Nokia as project lead, working closely with a strong consortium of European partners. Nokia was also named the overall leader for 6G-ANNA, a German state-funded 6G lighthouse project. Nokia is engaged in many other projects and initiatives with industry peers, customers, academia, and research institutions globally, spanning Europe, the U.S., and APAC, to form a common view and direction for 6G.

Nokia is a leader in passive optical networks (PON). Following our launch in 2020 of the first commercial 25G PON solution, Nokia Bell Labs invented the next generation solution, delivering a record-breaking 100 Gb/s on a single PON wavelength in 2022. World-class research on optical systems and devices innovations enabled record-breaking transmission speeds of up to 2 Tb/s on a single wavelength and Pb/s per fiber. Novel network architecture concepts that leverage artificial intelligence will allow for the frictionless deployment of cloud-native network services, and new business models across multiple stakeholders.

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We are actively engaged in leading and influencing standards and developing new standard-essential patents (SEPs), thus shaping future technologies and systems while contributing to our IPR portfolio.

We pursue future growth platforms through NGP Capital innovation outreach, and the in-house incubation and commercialization of venture projects. We are creating a strategic partner platform, as well as productive, global and multi-dimensional ecosystems for new business opportunities.

We are also focused on enabling Nokia as a best-in-class digital enterprise and identifying security requirements, trends and evolving risks, to position Nokia as a trusted security partner for the 5G era and beyond.



Our Technology Vision 2030

We see the network as critical to realizing the enormous range of potential that the metaverse opens in the industrial, enterprise and consumer spheres as we approach 2030.

Our Technology Vision provides directional input to Nokia's technology strategy and roadmap, serving as a valuable platform for strategic engagement with our customers and key stakeholders. We periodically refresh our Technology Vision to ensure our outlook remains cutting-edge, with the latest iteration released in September 2022.

By 2030, the world will have undergone a significant transformation. The global rate of technology adoption will be driven by trends such as environmental sustainability and cybersecurity. Advances in semiconductors, software, artificial intelligence (AI) and machine learning (ML) will continue to accelerate. But it will be the development of technologies that power the metaverse, cloud and Web3 that will have the greatest transformative impact. We expect human augmentation technologies, such as extended reality (XR), and digital-physical fusion technologies, such as digital twins, to be the key drivers of network transformation as we enter an era of unprecedented immersive technology and industrial digitalization.

We see metaverse opportunities clearly differentiated between consumer, enterprise, and industrial. The enterprise metaverse has a predominantly IT-focus, while the industrial has its primary focus on operational, 'mission-critical' technologies. We believe that all three segments promise significant revenue potential by 2030, and we are already seeing very solid traction in the industrial metaverse in particular with the adoption of digital twins in numerous areas across design, production and logistics.

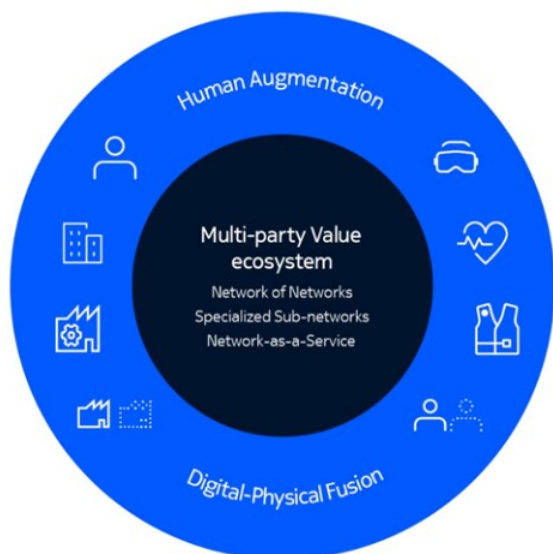
We see the network as the key enabler of metaverse opportunities – and the expectations on its capabilities will be stretched beyond what is possible today. The key attributes of the new network include:

- Radically enhanced performance, extreme capacity and optimization for a wide range of user-specific needs
- Heightened sensing and context-awareness; dynamically and automatically adapting connectivity
- 100% cloud-native design, supporting a distributed architecture and openness through developer-friendly application programming interfaces (APIs)
- Efficiency, resilience, and agility, with zero-touch management and AI/ML-driven, intent-based autonomy
- Security and energy efficiency features, designed-in as core requirements.

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The network will need to transform to meet these challenges alongside new paradigms, such as networks of networks, specialized sub-networks, and enriched 'Network-as-a-Service' capabilities.

We strongly believe that the opportunities of the metaverse will be realized by a multi-party value ecosystem, centered around the new network capabilities and as-a-service propositions. No single company will be able to provide all the solutions, and we expect a rich ecosystem to develop around collaboration, co-innovation and partnering. Nokia is strongly positioned to lead these collaborative advantages.



Our history

Nokia has been adapting to the needs of an ever-changing world for over 155 years.

Milestones

1865

Founded as a single paper mill operation

1960s

Nokia becomes a conglomerate comprising rubber, cable, forestry, electronics and power-generation businesses

2007

Entered a joint venture with Siemens, combining mobile and fixed-line phone network equipment businesses and creating Nokia Siemens Networks (NSN)

2011

Entered a strategic partnership with Microsoft to address increasing competition from iOS and Android operating systems

2011

Acquired the wireless network equipment division of Motorola

2013

Purchased Siemens' stake in NSN

2014

Sold the Devices and Services business to Microsoft

2016

Acquired Alcatel-Lucent, including Bell Labs, creating an innovation leader in next-generation technology and services

2017

Created Nokia Shanghai Bell, a joint venture between Nokia and China Huaxin, integrating Alcatel-Lucent Shanghai Bell Co. Ltd and Nokia China

2017-2021

Additional acquisitions enhancing our technology leadership such as:

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Deepfield, the US-based leader in real-time analytics for IP network performance management and security; Comptel, a Finland-based telecommunications software company; Unium, a Seattle-based software company that specializes in solving complex wireless networking problems for use in mission-critical and residential Wi-Fi applications; and Elenion, a US-based company focusing on silicon photonics technology

2022

Brought 6G vision to life with DOCOMO and NTT

Innovations

1926

Brought sound to motion pictures*

1947

Developed the transistor, a tiny device that revolutionized the entire electronics industry*

1954

Created the solar cell, enabling the conversion of the sun's energy into electricity*

1958

Developed the laser, creating the foundation for fiber optics*

1962

Launched the first communications satellite, Telstar 1, into orbit enabling the first ever broadcast of live television between the US and Europe*

1969

Developed Unix, the software system that made the large-scale networking of diverse computing systems and the internet practical*

1982

Introduced both the first fully digital local telephone exchange in Europe and the world's first NMT car phone

1991

Enabled the first GSM call using a Nokia phone over the Nokia-built network of Finnish communications service provider Radiolinja

1998

Became the world's largest manufacturer of mobile phones

2001

Invented MIMO (Multiple-Input and Multiple-Output), a key element of a large number of modern wireless systems, that allows for greater throughput without increasing bandwidth requirements*

2006

Developed Softrouter, a routing architecture permitting the development of a programmable, open network infrastructure to allow easier deployment of new services that make use of exposed network capabilities*

2014

Developed XG-FAST technology, enabling service providers to generate fiber-like speeds of more than 10Gbps over short distances using existing copper infrastructure*

2017

Developed Probabilistic Constellation Shaping, an innovative technology to get the most out of each fiber, irrespective of its length and capabilities

2019

Opened the world's first live end-to-end 5G lab, the Future X Lab in Murray Hill, New Jersey, US

2020

Selected by NASA to build and deploy the first end-to-end LTE solution on the lunar surface

Enabled commercial deployment of the world's first 5G liquid cooling solution

Set the 5G speed world record

2021

Developed the Resh programming language to take control of and manage a fleet of robots

2022

Showcased the first 100Gb/s fiber broadband technology in the US

Launched the Advanced Security Testing and Research (ASTaR) lab in Dallas - the first end-to-end 5G testing lab in the US focused solely on cybersecurity

Introduced the 6 pillars of Responsible AI

*Bell Telephone Laboratories (1925-1984). Following its acquisition by Nokia in 2016, it was renamed Nokia Bell Labs.

Customer Experience

Nokia's Customer Experience (CX) organization is designed to ensure we engage customers with a unified and consistent voice. The goal of the organization is to advocate for customers within Nokia, understanding the needs of each, to deliver the best possible experience and business outcomes.

The CX organization unites sales and customer marketing under one umbrella. This allows us to better leverage common platforms, processes and resources to drive brand awareness, create demand, and engage customers across all markets. CX drives growth across all network business group portfolios by engaging CSPs, enterprises (in target verticals), hyperscalers and governments, positioning Nokia as a technology leader, innovation partner, and solutions provider worldwide.

Our customers benefit from the unique insights resulting from our extensive analysis of the global market, and our experience working with diverse customer types around the world. This enables our customers to make the best strategic technology decisions to help grow their businesses.

While enterprise sales, marketing and delivery are part of the CX umbrella, the products and solutions developed for this diverse customer segment come from the business groups. Working across industries including manufacturing, energy, transportation and the public sector, as well as by harnessing the power of our growing partner community, the enterprise team helps customers address their unique business challenges through Industry 4.0 digital transformation. Our solutions help transform operations and modernize communication networks with leading next-generation technologies from across our businesses, including IP, optical, fixed networks, microwave, and private wireless networking. The enterprise team has worked with more than 2 600 organizations, connecting people and technologies, improving safety in the workplace (workers and operations) and in cities around the world. At the same time, we have increased automation and agility to boost productivity and efficiency, and helped our customers achieve greater resilience and sustainability through digitalization.

Together, CX and the business groups align on our go-to-market ambitions, resourcing, and customer requirements. This enables the business groups to remain accountable for their own financial performance. Collective competence is delivered consistently across all business groups, coupled with deep expertise across each unique industry we serve. This allows us to solve customer challenges, inspires growth, and enables our customers to achieve their immediate and long-term goals.

Case study

The Public Transport Authority of Western Australia will use Nokia's private wireless technologies to modernize rail communications in Perth

Private wireless networking is enabling Perth to enhance its public transportation program as part of the city's long-term blueprint for the future. The project includes designing, building, and maintaining The Public Transport Authority of Western Australia's next-generation communications system, covering 250 km of railway track and tunnels.

Powered by Nokia's private wireless network solution, the new railway communication system will help enhance the accuracy of the system, leading to improved experience and safety. Private wireless is a key technology in enabling and accelerating digital transformation across industries, including transportation.

2022 in brief

- Chosen by Reliance Jio India to build one of the largest 5G networks in the world
- Collaborated with T-Mobile to build flexible, scalable 5G networks, enabling applications that provide enterprise and government customers with superfast speeds and lower latency
- Selected by SK C&D to deploy managed SD-WAN to accelerate group wide digital transformation
- Chosen by Etisalat UAE to launch 5G private wireless networks to support digital transformation
- Chosen by American Tower to introduce SDN virtualization to redefine fiber broadband deployment in Argentina
- Extended our relationship with UScellular to boost its 5G network speed, capacity and coverage
- Selected by Moratelindo to deploy a high-performance optical transport network to boost capacity across Indonesia.

Network Infrastructure

Network Infrastructure had a very successful 2022, driven by our technology leadership and strong customer focus.

Federico Guillén
President, Network Infrastructure

Network Infrastructure builds business-critical and mission-critical networks for a wide range of CSP, enterprise, and webscale customers; delivering fixed access, IP routing, data center networks, and optical transport for both terrestrial and subsea applications.

Market overview

Demand for connectivity continues to be strong. Meanwhile, our customers—who include CSPs, enterprises, governments, webscalers and hyperscalers—are turning their attention to future drivers of demand. These include enterprise digitalization, the shift to the cloud, 5G and even 6G introduction, and digital/physical fusion and the metaverse. Customers are considering the demands these place on networks in terms of capacity, reliability, deterministic performance and security. At the same time, the urgency of climate change and heightened global economic uncertainty has renewed attention on the importance of sustainability and efficiency.

We continue to focus our innovation power on the products, platforms and solutions that address these issues. This includes providing established and new operators with the means to serve residential users, businesses, and Wi-Fi and 5G cells with a single access network, radically simplifying the massive scale in optical networks, or focusing on the need for highly scalable, deterministic, and power-efficient capacity in IP networks.

The estimated Network Infrastructure addressable market, excluding Submarine Networks (1), for 2022 was EUR 47 billion. We currently forecast an addressable market, excluding Submarine Networks (1) for 2023 of EUR 48 billion, reflecting year-over-growth of approximately 4%, excluding the impact of changes in foreign currency exchange rates.

Business overview and organization

Our business divisions are: Fixed Networks, IP Networks, Optical Networks and Submarine Networks.

Fixed Networks offers fiber and copper-based access infrastructure, Wi-Fi in-home solutions, the cloud and virtualization. In 2022, we continued to advance our leading position in passive optical networks (PON) (2). We were first-to-market with a 25G PON solution and have shown up to 100G PON proofs of concept with customers in Europe and the USA. We continue to innovate around solutions that will allow our customers to lead today, while protecting their investments for the future. Our Lightspan MF-14 product, launched in Q4, is the world's first generation 6 broadband platform, enabling the convergence of all services on a single fiber infrastructure. This solution has already been selected by customers building 25G capable networks in Europe, North America and Asia Pacific. We have reinforced our market leadership (3) in 5G Fixed Wireless Access with the world's first large-scale, long-reach 5G mmWave deployment for Australia's National Broadcaster nbn.

IP Networks is a global leader in IP access, aggregation, and edge and core routing for residential, business, mobile, cloud and digital industry applications. Our ability to offer high-performance and massively scalable networks is enabled through our industry-leading, in-house designed FP5 routing silicon and FP5-based routing platforms. Combined with our network automation and security platforms, we further enable customers to efficiently control, manage, analyze and secure their IP networks. We are actively driving the next generation in IP routing – 800 Gigabit Ethernet – which we have trialed with customers including BT, DE-CIX and LINX.

Our software-defined WAN solutions bring easy, efficient network connectivity configuration among clouds and to any enterprise branch. Our next-generation data center fabric makes cloud environments easier to scale, adapt and operate.

Optical Networks is a leader in optical transport networks for metro, regional, long-haul and ultra-long-haul applications. Our approach helps communications service providers address the massive growth in bandwidth demand, while simplifying network operations through software tools and automation. This enables a more streamlined service delivery and a lower total cost of ownership. The portfolio includes coherent optical transponders, optical transport network switching, wavelength-division multiplexing, reconfigurable optical add-drop multiplexer solutions and optical line systems. Our successful rollout of our fifth generation of coherent optical technology, based on our in-house designed PSE-V digital signal processor, highlights our focus on and commitment to technology innovation.

Submarine Networks continues to be a leader in the growing undersea telecoms networks segment and saw continued growth in demand in 2022, led by hyperscalers and driven by factors ranging from increased cloud computing to virtual reality, as well as by the need to bring the advantages of connectivity to previously underserved parts of the world. Our technology innovation and customer focus helped take Submarine Networks above EUR 1 billion in sales this year, a first for this business division.

Competition

Our competitors include Huawei and ZTE, along with Calix and Adtran (Fixed Networks), Cisco and Juniper (IP Networks), Ciena and Infinera (Optical Networks), and Subcom and NEC (Submarine Networks).

100 Gb/s

Nokia was first to showcase 100 Gb/second fiber broadband technology in the US

800GE

We started enabling customers to roll out 800GE services

1 000 km+

We demonstrated 600G transmission over a 1 000 km+ long-haul optical network

2022 in brief

In 2022, Network Infrastructure's net sales grew by 18% from 2021. Continued strong performance across all business divisions—particularly Fixed Networks and Submarine Networks—was responsible for this result and helped take our segment operating margin up by 200 basis points to 12.2%.

- Launched Lightspan MF-14: the world's first generation 6 broadband platform
- Chosen by Microsoft to implement our data switching portfolio for its data center networks
- Selected by nbn for our mmWave FWA technology
- By the end of 2022, we had more than 30 customers for FP5, and had undertaken trials with customers including BT
- Selected by TIME dotCom to build a high resilience optical network in Malaysia
- Took delivery of a new submarine cable maintenance vessel, boosting our existing fleet.

(1) Also excluding Russia and Belarus.

(2) Dell'Oro BB Access Report 2Q22.

(3) 650 Group Report 2Q22.

Mobile Networks

2022 saw Mobile Networks make progress with delivering sustainable, profitable growth. We continued with strong investments in research and development to secure technology leadership and grew our customer base, despite global supply constraints.

Tommi Uitto
President, Mobile Networks

Mobile Networks creates products and services covering all mobile technology generations. Its portfolio includes products for radio access networks (RAN) and microwave radio (MWR) links for transport networks and solutions for network management, as well as network planning, optimization, network deployment and technical support services.

Market overview

The estimated Mobile Networks addressable market (1) for 2022 was EUR 51 billion. We currently forecast an addressable market (1) of EUR 53 billion by 2023, reflecting year-over-year growth of approximately 5%, excluding the impact of changes in foreign currency exchange rates.

We see opportunities in 5G that go beyond building coverage and capacity for basic mobile voice and mobile broadband. This includes industrial 5G use cases with private wireless networks in various segments such as manufacturing and logistics, seaports and cargo handling, airports and airline companies, mining vehicles and operations, utilities such as electricity, gas and water, smart agriculture, and smart cities.

There are opportunities in 4G/5G network slicing, artificial intelligence and machine learning (AI/ML) and network architecture evolution with Cloud RAN and O-RAN. We will also support the deployment of 5G-Advanced networks with feature and solution areas including Extended Reality (XR) and prepare capabilities for the introduction of 6G towards the end of the decade.

The RAN market in 2022 faced various challenges including continued, industry-wide supply chain disruptions and geopolitical turbulence, largely and especially due to Russia's invasion of Ukraine. However, outside of Russia, Nokia grew its RAN sales in almost all markets.

Business overview and organization

Like many others, Nokia was impacted by industry-wide supply constraints, particularly in the first half of the year. However, Nokia was able to mitigate this impact, retaining all of its customers and the entirety of its global RAN footprint in 2022. Since the start of 2019, we have added 41 new RAN customers in the CSP market, and another 28 CSP customers have increased their earlier RAN share with Nokia. We also increased the rate of converting 4G customers to 5G from a cumulative 90% in the fourth quarter of 2021 to a cumulative 110%, excluding China, at the end of 2022.

In 2022, we reached a cumulative number of 266 commercial 5G deals in the form of supply agreements, 83 of which were live 5G networks by the end of the year. Nokia has also grown its private wireless business, which has expanded to include over 560 customers, 100 of which are 5G customers. Nokia announced new, important 5G deals in the CSP market this year – including those with Bharti Airtel and Reliance Jio in India, AT&T in Mexico, Ice in Norway, and Indosat Ooredoo Hutchison and XL Axiata in Indonesia. We also announced long-term expansion deals with existing 5G customers including Chunghwa Telecom and Taiwan Mobile in Taiwan, and Orange and T-Mobile in Poland.

In 2022, Mobile Networks continued its investment in research and development to further strengthen our 5G portfolio's competitiveness and bring the best-performing networks to our customers. We also completed our target of converting close to 100% of our 5G deliveries to ReefShark System-on-Chip (SoC) technology in 2022, while keeping a few selected products FPGA-based when doing so best suited the needs of the customer.

In 2022, we demonstrated first-to-market 5G features including:

- Three and four component carrier aggregation (3CC CA and 4CC CA), which allows for increased data speeds and extended coverage, and announced related technology agreements with A1 Austria, BT in the UK, China Mobile, du in the UAE, Optus in Australia, Telefónica Germany, T-Mobile in the US and stc in Saudi-Arabia.
- Nokia also announced a RAN slicing deal with Proximus in Belgium and demonstrated a new dynamic network slicing solution with Google, as well as the world's first commercial 5G SA network with network slicing for Fixed Wireless Access with Telia in Finland.
- We also achieved an uplink speed record with Elisa and Qualcomm in Finland, leveraging millimeter wave spectrum with carrier aggregation, and the deployment of the world's first 5G Edge Slicing solution on a live commercial network with Cellcom in Israel and Telia in Finland.

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In 2022, we have also continued to invest in our Open RAN capabilities, with the majority of Nokia's SoCs and new hardware and software platforms now being O-RAN ready. This gives us the opportunity to support customers that are interested in O-RAN. Nokia also expanded its partner base for Cloud RAN solutions and added IBM, Dell and HPE to its list of partners, which also includes Amazon Web Services (AWS), Google Cloud and Microsoft Azure. We also announced a 3GPP non-terrestrial (NTN) RAN deal with AST SpaceMobile that will enable them to offer direct-to-cell phone connectivity from space – a move which marks our entry and leadership into the emerging non-terrestrial networks (NTN) market segment. During 2022, several new products were added to the Nokia Wavence MWR portfolio. This includes a new dual-band, high-capacity outdoor transceiver. This will help to fulfil the needs of the rapidly growing rural broadband market. Nokia also trialed a live MWR backhaul connection utilizing D-Band spectrum. This will serve as an ultra-high-capacity extension for both 5G backhaul and fronthaul in dense urban environments.

In services, we continued investing in digitalization and AI/ML-based capabilities to enable faster rollouts and the speedy resolution of network faults, while maximizing network performance. With our digital services portfolio, we are helping our customers accelerate their entire network lifecycle, from network design and optimization to deployment and technical support services. We are upgrading approximately two million nodes for our customers per year, while designing and optimizing more than 380 000 radio sites. In addition, over 400 customers are using our AI-driven Nokia Digital Assistant to help them solve network issues faster.

Nokia's technology is designed to be energy efficient and contribute towards mobile operators' climate and environmental targets. In 2022, Nokia announced the commercial availability of its liquid cooled AirScale Baseband portfolio, which enables a reduction in cooling system energy consumption of up to 90%. We also introduced the Intelligent RAN Operations solution for heightened 5G network management, which reduces base station energy consumption by up to 15%.

Competition

The RAN market is a highly consolidated market. Our main competitors are Huawei, Ericsson, Samsung and ZTE, but there are also a number of smaller competitors competing in specific technology or regional sub-segments, such as NEC and Fujitsu. Smaller suppliers in the RAN market include, for example, Mavenir, Rakuten Symphony, Parallel Wireless and JMA Wireless. In MWR, our key competitors include Ceragon, NEC and Aviat, alongside Huawei and Ericsson.

266

commercial 5G deals in the form of supply agreements

At the end of 2022, our System-on-Chip based 5G Powered by ReefShark product portfolio accounted for

97% of shipments

2022 in brief

In 2022, Mobile Networks net sales grew 10% to EUR 10.7 billion. We increased investments in R&D to accelerate our product roadmaps towards technology leadership. Despite these investments and inflationary pressures, improved cost competitiveness and execution meant we were still able to deliver a segment operating margin of 8.8% in 2022, remaining stable year-on-year.

- Reached 266 commercial 5G deals and had more than 560 private wireless customers, 118 with 5G
- First to demonstrate innovative 5G features such as three and four component carrier aggregation (3CC CA and 4CC CA) and network
- Expanded the Nokia Wavence MWR portfolio including a new dual-band, high-capacity outdoor transceiver with market-leading RF output power, helping to fulfill the needs of the rapidly growing rural broadband market
- Expanded our partner base for Cloud RAN solutions, which now includes AWS, Google Cloud, Microsoft Azure, IBM, Dell and HPE.

(1) Excluding China, Russia and Belarus.

Cloud and Network Services

CNS made important progress in 2022 in its mission to help customers and partners create new value, deliver innovative digital services, and transform business operations. This was done with solid momentum in rebalancing our portfolio and delivering year-over-year sales growth, as well as gross margin and segment operating profit growth.

Raghav Sahgal
President, Cloud and Network Services

With its combined cloud, software, and services capabilities, Cloud and Network Services (CNS) serves communication service providers (CSPs), enterprises, hyperscale customers, digital developers, and partners, and is helping them navigate three major industry transitions: the introduction and monetization of 5G networks, the cloudification of communications platforms and software, and the transition to as-a-Service models. These transitions are shaping the emerging digital ecosystem.

Market overview

The introduction and monetization of 5G networks and services, the cloudification of communications platforms and software and the transition to as-a-Service models are increasing demands on organizations to find new ways to generate returns on their digital assets, optimize costs, navigate complexity, and mitigate security risks for their mission-critical networks.

The estimated CNS addressable market (1) for 2022 was approximately EUR 28 billion. We forecast a total addressable market (1) in 2023 of EUR 29 billion, reflecting year-over-year growth of approximately 4%, excluding the impact of changes in foreign currency exchange rates.

Business overview and organization

CNS is composed of four business units: Business Applications, Cloud and Cognitive Services, Core Networks, and Enterprise Solutions. Our emerging Software-as-a-Service (SaaS) delivery model underpins each business unit to help customers transition to greater network flexibility and achieve faster time to value. In October 2022, we announced our Network Monetization Platform, which aims to accelerate the monetization of our open products in Business Applications, Core, and MX Industrial Edge.

CNS delivers cloud-native solutions that provide network quality of service and agility; and enable customers to leverage intelligence that facilitates network efficiency, self-protection and self-healing, and energy management. We deploy industrial solutions that drive digital transformation and Industry 4.0, and help CSPs automate network operations and manage security.

In 2022, we were ranked #1 by Omdia for our 5G Standalone Core portfolio competitiveness strength (2); ranked #1 in Private Cellular Networks by 650 Group (3); awarded two TM Forum Excellence awards for our software in AI, Data & Insights and Customer Experience & Trust (4); rated #1 in automated assurance by Analysys Mason (5); and rated again by GlobalData as a Managed Infrastructure Services leader (6).

We have rebalanced our investment to accelerate and scale our portfolio growth areas of 5G core software, analytics and AI Services, digital operations, monetization, private wireless and industrial automation, and security. We believe these fast-growing, higher-margin areas are important to our CSP and enterprise customers and reflect our view on the emergence of a new digital ecosystem that is essential to value creation in a 5G world.

Expanding on this view and how it has informed the rebalanced operations of CNS, the new digital ecosystem is one in which we believe players will converge to combine their expertise to create services across areas such as Industry 4.0 and the metaverse; and in which application developers create new 5G services that are stitched together in a larger service chain, delivering end-user value and driving the monetization efforts that our CSP and enterprise customers are heavily focused on.

Competition

The competitive environment comprises a large number of networking companies, infrastructure and application software suppliers, services specialists, hyperscalers, cloud providers and a wide range of industry segment businesses.

The market in which we compete has vendors and other industry participants which may on occasion be a customer, a partner, and a direct competitor, depending on the nature of the engagement. We are regularly building and nurturing alliances with partners such as IT vendors, hyperscalers, and systems integrators, which are increasingly influential in this space.

We have attained marketplace leadership in private wireless networking with more than

560 customers,

of which

118 included 5G

6 Software-as-a-Service offerings announced

including AVA Charging, AVA for Energy, and Core SaaS

AI-based energy management automation can reduce energy costs and carbon footprint by up to

30%

2022 in brief

We made important progress in 2022. We continued to rebalance our business towards accelerated value creation for our customers, partners, and for Nokia in the emerging digital ecosystem, including private wireless and industrial edge. With that progress, we generated net sales growth of 8% year-on-year and, through an improved cost position, posted a 5.3% segment operating margin, down 10 basis points from 2021, due to investments.

- Nokia's 5G Core selected to support Comcast's mobile connectivity efforts
- Launched cloud-native IMS Voice Core product to simplify network operations for communications service providers
- Strengthened private wireless leadership, with over 140 customers added in 2022 and deployments in 61 countries
- Key Enterprise launches included MX BOOST, DAC Wi-Fi, new Industrial devices, and MX Industrial Edge
- Signed multiple SaaS deals, including one with Equideum Health to power its healthcare blockchain solutions
- Strengthened our software focus in security, automation, and monetization, with AI binding the portfolio together.

(1) Excluding Russia and Belarus.

(2) Omdia Market Landscape: Core 2022, June 2022.

(3) 650 Group, "Private Cellular Quarterly Market and Long-Term Forecast Report." June 21, 2022.

(4) TM Forum Excellence Awards, September 2022.

(5) Analysys Mason, Automated assurance: worldwide market shares 2021, July 2022.

(6) Global Data Product Assessment report - Managed Infrastructure Services for telcos, February 15, 2022.

Nokia Technologies

Our patented inventions power entire industries such as smartphones, consumer electronics, video services, automotive and the wider Internet of Things (IoT) domain.

Jenni Lukander
President, Nokia Technologies

Nokia Technologies is responsible for managing Nokia's patent portfolio and monetizing Nokia's intellectual property, including patents, technologies and the Nokia brand.

Market overview

Nokia Technologies is responsible for managing Nokia's patent portfolio and monetizing Nokia's intellectual property, including patents, technologies and the Nokia brand, building on Nokia's continued innovation leadership, long-term investment into research and development, and decades of driving technology standards development. Licensees pay royalty fees for the use of our technology, which we re-invest, along with additional investment, in developing the next generation of inventions.

Net sales for the full-year were up 6% to EUR 1 595 million and segment operating profit was up 2% at EUR 1 208 million. We signed over 50 new patent license agreements across our licensing programs, including a new agreement with Huawei. And revenues from our automotive, consumer electronics, and IoT programs, which were negligible in 2018, grew to more than EUR 100 million in 2022.

Business overview and organization

Nokia Technologies has three business areas: Patent Licensing of Nokia's patent portfolio, Technology Licensing of Nokia's technologies for integration into consumer devices, and Brand Partnerships for licensing the Nokia brand.

Patent Licensing: We manage the Nokia patent portfolio, working with other Nokia business groups, and continue to grow our patent licensing and monetization activities, which drive most of Nokia Technologies' net sales. The core of our business is the mobile devices licensing program, where we have agreements with most major smartphone vendors. We also have patent licensing programs for consumer electronics, video services, automotive and the wider IoT domain.

Technology Licensing: We license our OZO Audio and OZO Playback multimedia technologies to smartphone and camera manufacturers, and drive advanced audio and video research and standardization, along with product incubation for new immersive voice and video solutions.

Brand Partnerships: We license the Nokia brand - a global brand that is recognized by almost everyone - to HMD Global, the company behind Nokia-branded phones and tablets, and other brand partners.

Innovation and standards leadership

Nokia has defined many of the fundamental technologies used in virtually all mobile devices and taken a leading role in open standardization. Since 2000, Nokia has invested more than EUR 140 billion in research and development (R&D). As a result, we own one of the broadest and strongest patent portfolios in the telecommunications sector with around 20 000 patent families (each family can comprise several individual patents).

We own a leading share of Standard Essential Patents (SEPs) in every generation of cellular standards, with over 4 500 patent families declared as essential to 5G standards. We have been ranked #1 in several independent third-party studies for our cellular standards patents.

Our portfolio also covers significant multimedia assets, particularly in video compression technology, which allows large files to be shared across the internet. The work of Nokia's inventors in video research and standardization has been recognized with numerous prestigious awards, including five Technology & Engineering Emmy® Awards.

Nokia was one of the first companies in the world to achieve the globally recognized ISO 9001 certification for our high-quality patent portfolio management processes.

Our portfolio has a long lifetime, with the vast majority of patents still in force in ten years' time. We continue to refresh our portfolio with new inventions every year. In 2022, we filed patent applications on more than 1 700 new inventions, enabling 5G networks, connected 5G devices and more. As we continue to invest heavily in R&D and standardization, the annual number of filings is expected to grow.

4 500+

patent families declared as essential to 5G standards

1 700+

patents filed on new inventions

2022 in brief

Net sales for the full-year were up 6% to EUR 1 595 million and segment operating profit was up 2% at EUR 1 208 million.

- Drove innovation, filing over 1 700 new inventions, and reaching 4 500 patent families declared as essential to 5G standards
- Signed over 50 new patent license agreements including a new agreement with Huawei
- Received a Technology & Engineering Emmy® Award together with our partners for our video standardization efforts
- Introduced Immersive Voice, the next-generation voice communication solution with real-time spatial audio
- Courts in Germany, the Netherlands and the UK ruled in our favor in our patent infringement proceedings against OPPO, OnePlus and Realme.

Supply chain, sourcing and manufacturing

Despite the easing of global supply chain constraints towards the end of the year, 2022 remained highly challenging, as ongoing supply chain disruptions continued to affect operations across industries.

Nokia's supply chain is essential for our customers, our business, and for managing customer demand and supply for our hardware, software and contract manufactured products. Our end-to-end operations include sourcing, demand and supply planning, manufacturing, distribution and logistics.

In 2022, we purchased over EUR 15 billion worth of products and services from around 11 000 different suppliers.

While new opportunities for better managing our supply chain emerged in 2022, there were also challenges. Rising geopolitical instability, the continued reduced availability of semiconductors, COVID-19-related lockdowns, and impacts stemming from climate change continued to affect operations across industries. Nokia did, however, perform well despite these global challenges.

Early in 2022, we saw meaningful constraints on our ability to supply our customers due to component availability, although as the situation improved through the second half of the year, the financial impact on our net sales for the full year was minimal. Cost inflation through the supply chain also impacted our margins but through continued focus on improving our product cost and careful management of our customer pricing, we were largely able to offset this and still deliver an improved gross margin in 2022.

Increasing resilience through strong partnerships and a regional approach

As we further develop a robust and sustainable supply chain that can best serve our customers, increasing resilience is critical. We continuously optimize our manufacturing, distribution and supplier network across the regions in which we operate to better serve our customers. We also leverage artificial intelligence and machine learning capabilities to better develop our supply chain and factory network.

Our geographically dispersed manufacturing network consists of both our own manufacturing (23% of the network) and contract manufacturing partners to minimize geographic and geopolitical risks. Our network is strategically located around the world: Europe (27%), Asia Pacific, Japan/India (27%), China (32%) and the Americas (14%). Our regional approach will not only enable us to deliver a more rapid response to our customers' needs, but also reduce transportation costs and CO2 emissions.

In 2022, we increased manufacturing capacity with a contract manufacturer in Europe and opened a new distribution hub in Japan. Furthermore, we are in the process of further regionalizing our manufacturing and distribution to be closer to our customers in different regions. Due to the continued uncertainties caused by the current geopolitical situation, we have reviewed and optimized our inventory strategies to increase resilience. Where needed, we have successfully activated business continuity plans to ensure uninterrupted manufacturing.

Sustainability through innovation

We are committed to cutting greenhouse gas emissions across our value chain by 50% by 2030, in line with our science-based target. This commitment requires action from us, but also from across our value chain. We work closely with the entirety of our supply chain to develop new digital solutions and product innovations to cut emissions. Our own factories are on track to be carbon neutral by 2025, powered by hydro, wind, solar and other sustainable sources. In 2022, we continued to work with our Electronics Manufacturing services suppliers to build the roadmaps to achieve a mutually agreed target that the Nokia portion of their manufacturing reach net zero by 2030.

We clearly communicate our Third-party Code of Conduct and Nokia Supplier Requirements—which incorporate Responsible Business Alliance (RBA) Code of Conduct requirements—to our suppliers. These include standards for responsible sourcing in important areas such as the environment and human rights. Adherence is checked through audits and EcoVadis documentation audits, before being followed-up via one-on-one sessions. In 2022, we also conducted dedicated learning sessions that focused on labor migration, diversity and inclusion, circularity and recycled materials.

We continued to collaborate with our suppliers to encourage sustainable solutions in transportation, logistics and packaging. We are committed to prioritizing and strengthening resilience and sustainability across the end-to-end supply chain to help us deal with challenges that arise effectively, and to be prepared for any future challenges.

Refer to the "Sustainability and Corporate Responsibility" section for more information on Nokia's sustainability targets and achievements, including those related to supplier sustainability.

Own manufacturing

As of 31 December 2022, the production capacity for our wholly owned sites is noted below:

Country	Location and products ⁽¹⁾	Productive capacity, Net (m ²) ⁽²⁾
Australia	Kilsyth: radio frequency systems ⁽³⁾	5 400
China	Suzhou: radio frequency systems ⁽⁴⁾	27 000
Finland	Oulu: base stations	10 000
France	Calais: submarine cables	61 000
France	Trignac: radio frequency systems ⁽⁵⁾	7 300
Germany	Hannover: radio frequency systems	23 500
India	Chennai: base stations, radio controllers and transmission systems, fixed networks	14 385
Poland	Bydgoszcz: remanufacturing, product integration	15 200
UK	Greenwich: submarine cables	11 000
USA	Meriden: radio frequency systems ⁽⁴⁾	31 000

(1) We consider the production capacity of our manufacturing network to be sufficient to meet the requirements of our business. The extent of utilization of our manufacturing facilities varies from plant to plant and from time to time during the year. None of these facilities is subject to a material encumbrance.

(2) Production capacity equals the total area allotted to manufacturing and to the storage of manufacturing-related materials.

(3) The manufacturing activities in this site were ramped down during the fourth quarter of 2022.

(4) In December 2022, Nokia entered into an agreement regarding the partial or full disposal of this location. The disposal is expected to be completed during year 2023.

(5) In January 2023, the relevant employee representatives were informed of a decision to initiate a study to stop all operations in this site within the second quarter of 2023.

50%

We are committed to cutting greenhouse gas emissions by 50% by 2030, in line with our science-based target.

2022 in brief

- Increased manufacturing capacity with a contract manufacturer in Europe in order to better serve our European customers and opened a new distribution hub in Japan.
- Enabled our Oulu factory to now operate on 99.6% renewable energy, and our Chennai factory on 63.2% renewable energy
- Showcased resiliency by utilizing pre-existing business continuity plans, with Nokia and our manufacturing partners rapidly able to move manufacturing temporarily from Ukraine to alternate locations, with minimal impact on business output
- Continued addressing with suppliers on labor rights due diligence via onsite and online assessments. Also conducted a deep dive into ethical recruitment and modern slavery topics
- Shared our new waste circularity requirement for 2030 and established a baseline with our final assembly suppliers
- Held in-depth awareness and assessment on circular materials contents for key metals with materials suppliers.

Corporate governance

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Corporate governance statement

“In 2022, we continued delivering on Nokia’s commitment to strong corporate governance and related practices. To do that, the activities of the Board of Directors are structured to develop the Company’s strategy and to enable the Board to support and oversee the management on the delivery of it within a transparent governance framework.”

This corporate governance statement is prepared in accordance with Chapter 7, Section 7 of the Finnish Securities Markets Act (2012/746, as amended) and the Finnish Corporate Governance Code 2020 (the “Finnish Corporate Governance Code”).

Regulatory framework

Our corporate governance practices comply with Finnish laws and regulations, our Articles of Association approved by the shareholders and corporate governance guidelines (“Corporate Governance Guidelines”) adopted by the Board of Directors. The Corporate Governance Guidelines reflect our commitment to good corporate governance. They include the directors’ responsibilities, the composition and election of the members of the Board and its Committees, and certain other matters relating to corporate governance. We also comply with the Finnish Corporate Governance Code adopted by the Securities Market Association.

In addition, we comply with the rules and recommendations of Nasdaq Helsinki and Euronext Paris as applicable to us due to the listing of our shares on the exchanges. Furthermore, as a result of the listing of our American Depositary Shares on the New York Stock Exchange (NYSE) and our registration under the US Securities Exchange Act of 1934, we follow the applicable U.S. federal securities laws and regulations, including the Sarbanes-Oxley Act of 2002 as well as the rules of the NYSE, in particular the corporate governance standards under Section 303A of the NYSE Listed Company Manual. We comply with these standards to the extent such provisions are applicable to us as a foreign private issuer.

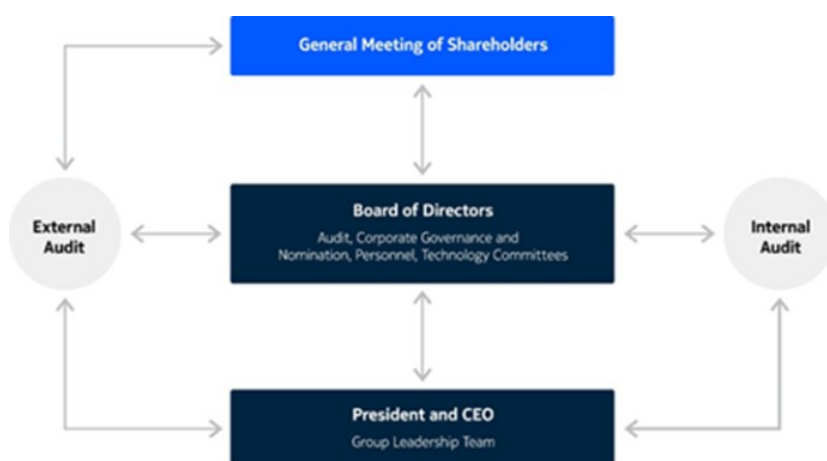
To the extent compliance with any non-domestic rules would conflict with the laws of Finland, we are obliged to comply with Finnish laws and applicable regulations. There are no significant differences in the corporate governance practices applied by Nokia compared with those applied by U.S. companies under the NYSE corporate governance standards with the exception that Nokia complies with Finnish law with respect to the approval of equity compensation plans. Under Finnish law, stock option plans require shareholder approval at the time of their launch. All other plans that include the delivery of company stock in the form of newly issued shares or treasury shares require shareholder approval at the time of the delivery of the shares unless shareholder approval has been granted through an authorization to the Board, a maximum of five years earlier. The NYSE corporate governance standards require that the equity compensation plans are approved by the company’s shareholders. Nokia aims to minimize the necessity for, or consequences of, conflicts between the laws of Finland and applicable non-domestic corporate governance standards.

In addition to the Corporate Governance Guidelines, the Committees of the Board have adopted charters that define each Committee’s main duties and operating principles. The Board has also adopted the Code of Conduct that applies to directors, executives, and employees of Nokia, as well as employees of Nokia’s subsidiaries and affiliated companies (such as joint ventures) in which Nokia owns a majority of the shares or exercises effective control. Furthermore, the Board has adopted the Code of Ethics applicable to our key executives, including the President and CEO, CFO and Corporate Controller.

Main corporate governance bodies of Nokia

Pursuant to the provisions of the Finnish Limited Liability Companies Act (2006/624, as amended) (the “Finnish Companies Act”), the legislation under which Nokia operates, and Nokia’s Articles of Association, the control and management of Nokia are divided among shareholders at a general meeting of shareholders, the Board, the President and CEO and the Group Leadership Team, chaired by the President and CEO.

Corporate governance framework



General Meeting of Shareholders

Nokia’s shareholders play a key role in corporate governance, with our Annual General Meeting offering a regular opportunity to exercise their decision-making power in Nokia. In addition, at the meeting the shareholders may exercise their right to speak and ask questions.

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Each Nokia share entitles a shareholder to one vote at general meetings of Nokia. The Annual General Meeting decides, among other things, on the election and remuneration of the Board, the adoption of annual accounts, the distribution of retained earnings shown on the balance sheet, discharging the members of the Board and the President and CEO from liability, as well as on the election and fees of the external auditor. As of the Annual General Meeting 2020, the Remuneration Policy is presented to the general meeting at least every four years and the Remuneration Report annually as of 2021. Resolutions of the general meeting regarding the policy and the report are advisory.

In addition to the Annual General Meeting, an Extraordinary General Meeting may be convened when the Board considers such a meeting to be necessary, or when the provisions of the Finnish Companies Act mandate that such a meeting must be held.

The Finnish Companies Act was amended on 11 July 2022 to enable limited liability companies to hold hybrid and virtual-only general meetings. The legal requirements for these type of meetings are stringent in Finland, namely, to protect the shareholders' rights. A virtual general meeting, as defined by the Finnish Companies Act, is a meeting held without a physical meeting venue, where shareholders must be able to exercise their shareholder rights in full and in real-time by virtual means, including by voting in real-time and asking questions orally during the meeting.

Once reliable technical methods for automated foreign shareholder identification become available in Finland, virtual general meetings would improve the position of nominee-registered private shareholders residing outside of Finland, who in practice may have been unable to attend the general meeting in person or be represented by proxy. The benefits of the virtual general meetings would further include the reduced environmental footprint and the ability of the company to hold a general meeting also under extraordinary external circumstances such as navigating through restrictions on physical gatherings. Nokia is actively involved in discussions how to enable the automated identification of foreign shareholders as we believe the Finnish legislation should be considered a model example of protecting shareholders' rights in the hybrid and virtual meetings.

[Annual General Meeting 2022 and 2023](#)

The Annual General Meeting 2022 took place at the Company's headquarters in Espoo on 5 April 2022. To prevent the spread of the COVID-19 pandemic, the Board resolved on extraordinary measures pursuant to the temporary legislation approved by the Finnish Parliament on 8 May 2021. The Annual General Meeting 2022 was held without shareholders and their proxy representatives being present at the meeting venue. Participation in the Annual General Meeting and use of shareholder rights was possible only by voting in advance as well as by submitting counterproposals and asking questions in advance. A total of 59 301 shareholders representing a record number of approximately 3 100 million shares and votes participated the Annual General Meeting through advance voting and the Board's proposals were supported by at least 91% of the votes casted. We were pleased to see both the record number of votes as well as the strong shareholders' support received for all of the Board's proposals at the Annual General Meeting 2022.

Nokia Corporation's Annual General Meeting 2023 is planned to be held on 4 April 2023. Proposals of the Board of Directors to the Annual General Meeting 2023 were published on 26 January 2023.

[Board of Directors](#)

The operations of Nokia are managed under the direction of the Board, within the framework set by the Finnish Companies Act and Nokia's Articles of Association as well as any complementary rules of procedure as defined by the Board, such as the Corporate Governance Guidelines and the charters of the Board's Committees.

Election and composition of the Board of Directors

Pursuant to the Articles of Association of Nokia Corporation, we have a Board that is composed of a minimum of seven and a maximum of 12 members. The members of the Board are elected at least annually at each Annual General Meeting with a simple majority of the shareholders' votes cast at the meeting. The term of a Board member begins at the close of the general meeting at which he or she was elected, or later as resolved by the general meeting, and expires at the close of the following Annual General Meeting. The Annual General Meeting convenes by 30 June annually.

Our Board's leadership structure consists of a Chair and Vice Chair elected annually by the Board and confirmed by the independent directors of the Board from among the Board members upon the recommendation of the Corporate Governance and Nomination Committee. The Chair of the Board has certain specific duties as stipulated by Finnish law and our Corporate Governance Guidelines. The Vice Chair of the Board assumes the duties of the Chair of the Board in the event he or she is prevented from performing his or her duties.

The independent directors of the new Board also confirm the election of the members and chairs for the Board's Committees from among the Board's independent directors upon the recommendation of the Corporate Governance and Nomination Committee and based on each Committee's member qualification standards. These elections take place at the Board's assembly meeting following the general meeting.

The Corporate Governance and Nomination Committee's aim is to continually renew the Board to ensure an efficient Board of international professionals with a diverse mix of skills, experience and other personal qualities in line with the diversity principles established by the Board. The Corporate Governance and Nomination Committee considers potential director candidates based on the short- and long-term needs of the Company. In the process to identify and select the candidates matching these needs and desired profiles, the Committee engages search firms and external advisors.

Board independence

In accordance with the Corporate Governance Guidelines adopted by the Board of Directors, the Board shall have a majority of Directors who meet the criteria for independence as defined by the Finnish Corporate Governance Code (independent of both the company and any significant shareholders who hold at least 10% or more of the total shares or voting rights of the Company) and the rules of the NYSE. Furthermore, all of the members of the Board Committees shall be independent Directors under the relevant criteria for independence required by the Finnish Corporate Governance Code and the applicable rules of the NYSE.

The Board will monitor its compliance with these requirements for Director independence on an ongoing basis. Each independent director is expected to notify the Chair of the Corporate Governance and Nomination Committee, as soon as reasonably practicable, in the event that his or her personal circumstances change in a manner that may affect the Board's evaluation of such director's independence. The Board of Directors evaluates the independence of its members annually and, in addition to this, on a continuous basis with the assistance of the Nomination and Governance Committee.

Board diversity

The Board has adopted principles concerning Board diversity describing our commitment to promoting a diverse Board composition and how diversity is embedded into our processes and practices when identifying and proposing new Board candidates as well as when proposing re-election of current Board members.

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At Nokia, diversity is not a static concept but rather a relevant mix of required elements for the Board as a whole that evolves with time based on, among other things, the relevant business objectives and future needs of Nokia. Board diversity is treated as a means of improvement and development rather than an end in itself. Diversity of our Board is considered from a number of aspects including, but not limited to, skills and experience, tenure, age, nationality, ethnicity, cultural and educational backgrounds, self-declared gender identity, sexual orientation as well as other individual qualities. The Board shall include representatives of more than one gender.

Nokia acknowledges and supports the resolution adopted by the Finnish Government on 17 February 2015 on gender equality on the boards of directors of Finnish large and mid-cap listed companies, as well as the board gender balance directive adopted by the European Parliament on 22 November 2022. We report annually on our objectives relating to equal representation of both genders, the means to achieve them, and the progress we have made in achieving them.

We have met our aim to have at least 40% of the Director positions held by members of the underrepresented genders on our Board composition. Also in the Board composition proposed to the Annual General Meeting 2023, 50% of the Board members are female.

Director time commitments

The Corporate Governance and Nomination Committee monitors closely the time commitments of the Board members and annually reviews the Directors' attendance rate at the Board and relevant Committee meetings to ensure they are able to devote the appropriate time to the Company to carry out their duties and responsibilities. The Corporate Governance Guidelines of the Board include numerical limits and a process for pre-clearance of new roles in public companies. Directors should not serve on more than four other boards of public companies in addition to the Nokia Board, and no more than on three other boards of public companies in addition to the Nokia Board, in case they serve as board chair or lead independent director outside the Nokia Board. The Audit Committee members should not serve on more than two other audit committees of public companies in addition to the Nokia Audit Committee. No positions in excess of these limits may be held without a prior consent by the Chair of the Board and the Chair of the Corporate Governance and Nomination Committee determining that such positions would not impair the Director's service on the Nokia Board or Audit Committee.

The Corporate Governance and Nomination Committee will annually, ahead of preparing the proposal on the Board composition, review and assess the Directors' current and planned time commitments outside the Company to seek affirmation that all Directors acknowledge the time commitment principles set forth in the Corporate Governance Guidelines of the Board.

Current members of the Board of Directors

The Annual General Meeting held on 5 April 2022 elected ten members to the Board for a term ending at the close of the next Annual General Meeting. Sari Baldauf, Bruce Brown, Thomas Dannenfeldt, Jeanette Horan, Edward Kozel, Søren Skou and Carla Smits-Nusteling were re-elected as Board members. Lisa Hook, Thomas Saueressig and Kai Öistämö were elected as new Board members. Following the meeting, the Board re-elected Sari Baldauf to serve as Chair and Søren Skou as the new Vice Chair of the Board for a term ending at the close of the next Annual General Meeting.

The current members of the Board are all non-executive. For the term that began at the Annual General Meeting 2022, all Board member candidates have been determined to be independent of Nokia and its significant shareholders under the Finnish corporate governance rules and the rules of the NYSE, as applicable.

Currently there are six different nationalities represented on the Board and 40% of the Board members are female.

In addition to biographical information of the Board members, the following table sets forth also the number of shares and American Depositary Shares (ADS) held by the members of the Board at 31 December 2022, when they held a total of 969 511 shares and ADSs in Nokia, which represented approximately 0.02% of our total shares and voting rights excluding shares held by the Nokia Group.

	Gender	Year of Birth	Nationality	Tenure ⁽¹⁾	Independent of the company and major shareholders	Shares ⁽²⁾	ADSs ⁽²⁾
Sari Baldauf (Chair)	Female	1955	Finnish	4	Independent	243 148	
Søren Skou (Vice Chair)	Male	1964	Danish	3	Independent	66 377	
Bruce Brown	Male	1958	American	10	Independent		202 941
Thomas Dannenfeldt	Male	1966	German	2	Independent	80 139	
Lisa Hook	Female	1958	American	0	Independent		15 227
Jeanette Horan	Female	1955	British	5	Independent		95 058
Edward Kozel	Male	1955	American	5	Independent		122 944
Thomas Saueressig	Male	1985	German	0	Independent	14 816	
Carla Smits-Nusteling	Female	1966	Dutch	6	Independent	114 045	
Kai Öistämö	Male	1964	Finnish	0	Independent	14 816	

(1) Terms as Nokia Board member before the Annual General Meeting on 5 April 2022.

(2) The number of shares or ADSs includes shares and ADSs received as director compensation as well as shares and ADSs acquired through other means. Stock options or other equity awards that are deemed as being beneficially owned under the applicable SEC rules are not included.

Experience and skills of the Board members

	Business Exec role with P&L responsibility	External boardroom roles / Governance expertise	Finance and accounting	Legal / Public policy / Compliance	Communications service provider market segment	Enterprise market segment	Technology	Cybersecurity	Environmental / Social issues
Current Board Members									
Sari Baldauf	x	x		x	x		x		x
Søren Skou	x	x		x		x			x
Bruce Brown		x		x			x		x
Thomas Dannenfeldt		x	x		x	x	x		
Lisa Hook	x	x	x	x	x	x	x		
Jeanette Horan		x	x			x	x	x	
Edward Kozel	x	x	x		x	x	x		
Thomas Saueressig	x	x			x	x	x	x	x
Carla Smits-Nusteling		x	x	x	x				
Kai Öistämö	x	x					x	x	x
Proposed new Board Members									
Timo Ahopelto	x	x				x	x		
Elizabeth Crain	x	x	x	x					

Proposed members of the Board of Directors

Proposals of the Board of Directors to the Annual General Meeting 2023 were published on 26 January 2023. On the recommendation of the Board's Corporate Governance and Nomination Committee, the Board proposes to the Annual General Meeting that the number of Board members be ten. Bruce Brown and Edward Kozel have informed that they will no longer be available to serve on the Nokia Board of Directors after the Annual General Meeting. Consequently, the Board proposes, on the recommendation of the Board's Corporate Governance and Nomination Committee, that the following eight current Board members be re-elected as members of the Nokia Board of Directors for a term ending at the close of the next Annual General Meeting: Sari Baldauf, Thomas Dannenfeldt, Lisa Hook, Jeanette Horan, Thomas Saueressig, Søren Skou, Carla Smits-Nusteling and Kai Öistämö.

Furthermore, the Board proposes, on the recommendation of the Corporate Governance and Nomination Committee, that the following new members be elected to the Board for a term ending at the close of the next Annual General Meeting: Timo Ahopelto, entrepreneur and Founding Partner of Lifeline Ventures, a venture capital firm; and Elizabeth Crain, co-founder and Chief Operating Officer of Moelis & Company, a global investment bank.

The Corporate Governance and Nomination Committee will propose in the assembly meeting of the new Board of Directors that Sari Baldauf be re-elected to serve as Chair of the Board and Søren Skou be re-elected to serve as Vice Chair of the Board, subject to their election to the Board of Directors. The Board composition proposed to the Annual General Meeting 2023 has representation of six nationalities and 50% of the proposed members are female.

The proposed members of the Board are all non-executive. For the term beginning at the Annual General Meeting 2023, all Board member candidates have been determined to be independent of Nokia and its significant shareholders under the Finnish corporate governance rules and the rules of the NYSE. Any possible changes impacting the independence assessment would be assessed as of the date of the Annual General Meeting. The Corporate Governance and Nomination Committee has prepared the proposed composition of the Board of Directors to the Annual General Meeting 2023 after careful assessment on proposed Directors' external time commitments, taking into account shareholders' expectations in this regard.

While the prevailing Finnish market practice is to vote on the proposed Board composition as a slate, some of our investors have expressed their preference of being able to vote on Directors individually. Nokia has been actively involved in the initiative to supplement the market practice as well as the Finnish Corporate Governance Code to enable the individual director election method in Finland. We are proud to be among the first Finnish companies to introduce this individual director election method and provide our shareholders with the opportunity to participate in the vote on individual Board member candidates in our forthcoming Annual General Meeting in 2023.

Biographical details of our current Board members

Chair Sari Baldauf

b. 1955

Chair of the Nokia Board since 2020. Board member since 2018. Member of the Corporate Governance and Nomination Committee and the Personnel Committee.

Master of Business Administration, Helsinki School of Economics and Business Administration, Finland. Bachelor of Science, Helsinki School of Economics and Business Administration, Finland. Honorary doctorates in Technology (Helsinki University of Technology, Finland) and Business Administration (Turku School of Economics and Business Administration and Aalto University School of Business, Finland).

Executive Vice President and General Manager, Networks Business Group, Nokia 1998–2005. Various executive positions at Nokia in Finland and in the United States 1983–1998.

Member of the Supervisory Board and Member of the Nomination Committee of Mercedes-Benz Group AG. Member of the Board of Directors of Aalto University. Senior Advisor of DevCo Partners Oy. Member of the Board of Directors and Member of the Executive Committee of Technology Industries of Finland.

Member of the Supervisory Board of Deutsche Telekom AG 2012–2018. Chair of the Board of Directors of Fortum Corporation 2011–2018. Member of the Board of Directors of Akzo Nobel 2012–2017.

Vice Chair Søren Skou

b. 1964

Vice Chair of Nokia Board since 2022. Nokia Board member since 2019. Member of the Personnel Committee.

MBA (honours), IMD, Switzerland. Bachelor of Business Administration, Copenhagen Business School, Denmark. Maersk International Shipping Education (M.I.S.E.).

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Chief Executive Officer of A.P. Møller - Mærsk A/S 2016–2022. Chief Executive Officer of Maersk Line 2012–2016. Chief Executive Officer of Maersk Tankers 2001–2011. Variety of executive roles, senior positions and other roles at A.P. Møller - Mærsk since 1983.

Chairman of the Board of the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping (a not-for-profit foundation). Member of The European Round Table for Industry.

Bruce Brown

b. 1958

Nokia Board member since 2012. Chair of the Personnel Committee. Member of the Corporate Governance and Nomination Committee and the Technology Committee.

MBA, Xavier University, the United States. BS (Chemical Engineering), Polytechnic Institute of New York University, the United States.

Chief Technology Officer of the Procter & Gamble Company 2008–2014. Various executive and managerial positions in Baby Care, Feminine Care, and Beauty Care units of the Procter & Gamble Company since 1980 in the United States, Germany and Japan.

Member of the Board of Directors, Chair of the Compensation Committee and member of the Nominating and Corporate Governance Committee of the Glatfelter Company.

Member of the Board of Directors, the Audit Committee and the Compensation Committee of Medpace Inc. 2016–2019. Member of the Board of Directors of Agency for Science, Technology & Research (A*STAR) in Singapore 2011–2018.

Thomas Dannenfeldt

b. 1966

Nokia Board member since 2020. Member of the Audit Committee and the Personnel Committee.

Degree in Mathematics, University of Trier, Germany.

Chief Financial Officer of Deutsche Telekom AG 2014–2018. Chief Financial Officer of Deutsche Telekom's German operations 2010–2014. Various operational positions (sales, marketing, customer care, finance and procurement in fixed and mobile business, national and international positions) at Deutsche Telekom 1992–2010.

Chair of the Supervisory Board of Ceconomy AG and Chair of the Presidential Committee and Mediation Committee. Member of the Board of Advisors at axxessio GmbH.

Member of the Board of Directors of T-Mobile US 2013–2018 and Buy-In 2013–2018. Chair of the Board of Directors of T-Systems International 2013–2018 and EE Ltd. 2014–2016.

Lisa Hook

b. 1958

Nokia Board member since 2022. Member of the Audit Committee.

Juris Doctorate, Dickinson School of Law at Pennsylvania State University, the United States. Bachelor's degree in Public Policy, Duke University, the United States.

President and CEO of Neustar, Inc. 2010–2018. COO of Neustar, Inc. 2008–2010. President and CEO of Sunrocket, Inc. 2006–2007. Executive positions at America Online, Inc. 2000–2004. Previous positions as Partner at Brera Capital Partners, managing director of Alpine Capital Group, LLC., various executive positions at Time Warner, Inc., legal advisor to the Chairman of the Federal Communications Commission, and General Counsel of the Cable Group at Viacom International, Inc.

Member of the Board of Directors and Chair of the Risk and Technology Committee of Fidelity National Information Services, Inc. Member of the Board of Directors and Chair of the Consumer Relationships and Regulation Committee of Philip Morris International. Member of the Board of Directors of Ritchie Bros. Auctioneers Inc. and Chair of the Compensation Committee. Member of the Board of Zayo Group and CubelQ. Chair of Advisory Board of Trilantic Capital Partners. Member of the U.S. National Security Telecommunications Advisory Committee since 2012.

Member of the Board of Directors of Ping Identity Holding Corporation 2019–2022, Partners Group Holdings 2020–2021 and Unisys Corporation 2019–2021. Member of the Board of Directors of Neustar, Inc. 2010–2019. Previous Board memberships at RELX Plc and RELX NV, 2006–2016, Covad Communications 2005–2007, Time Warner Telecom 1999–2001, K-12 Inc. and National Geographic Ventures.

Honored as a 2012 Penn State Alumni Fellow for leadership in technology by the Dickinson School of Law and Pennsylvania State University.

Jeanette Horan

b. 1955

Nokia Board member since 2017. Member of the Audit Committee and the Technology Committee.

MBA, Business Administration and Management, Boston University, the United States. BSc, Mathematics, University of London, the United Kingdom.

Various executive and managerial positions at IBM 1998–2015. Vice President of Digital Equipment Corporation 1994–1998. Vice President, Development of Open Software Foundation 1989–1994.

Member of the Supervisory Board at Wolters Kluwer, and the Chair of the Selection and Remuneration Committee. Member of the Board of Advisors at Jane Doe No More, a non-profit organization. Member of the Board of Directors of the Ridgefield Symphony Orchestra, a non-profit organization.

Member of the Board of Advisors of Cybereason 2017–2018. Member of the Board of Directors of West Corporation 2016–2017 and Microvision 2006–2017.

Edward Kozel

b. 1955

Nokia Board member since 2017. Chair of the Technology Committee and member of the Audit Committee.

Degree in Electrical Engineering and Computer Science, University of California, the United States.

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President and CEO of Range Networks 2013–2014. Owner of Open Range 2000–2013. Chief Technology and Innovation Officer and member of the Board of Management of Deutsche Telekom 2010–2012. CEO of Skyriders 2006–2008. Managing Director of Integrated Finance 2005–2006. Senior Vice President, Business development and Chief Technology Officer and Board member of Cisco 1989–2001.

Member of the Advisory Board at Telia Ventures 2016–2020.

Various Board memberships in 1999–2009.

Thomas Saueressig

b. 1985

Member of the Executive Board of SAP SE and Global Head of SAP Product Engineering. Nokia Board member since 2022. Member of the Technology Committee.

Degree in Business Information Technology, University of Cooperative Education in Mannheim, Germany. Joint Executive MBA from ESSEC, France and Mannheim Business School, Germany.

Chief Information Officer of SAP SE 2016–2019, Vice President, Global Head of IT Services of SAP SE 2014–2016. Held various positions at SAP in Germany since 2007, including assignment in the SAP Labs Silicon Valley in Palo Alto, California, the United States.

Member of the Young Global Leaders of the World Economic Forum. Member of the Industry Advisory Board of the Munich Institute of Robotics and Machine Intelligence (MIRMI).

Carla Smits-Nusteling

b. 1966

Nokia Board member since 2016. Chair of the Audit Committee and member of the Corporate Governance and Nomination Committee.

Master's Degree in Business Economics, Erasmus University Rotterdam, the Netherlands. Executive Master of Finance and Control, Vrije University Amsterdam, the Netherlands.

Member of the Board of Directors and Chief Financial Officer of KPN 2009–2012. Various financial positions at KPN 2000–2009. Various financial and operational positions at TNT/PTT Post 1990–2000.

Member of the Board of Directors and Chair of the Audit Committee of Allegro.eu SA. Member of the Board of Directors of the Stichting Continuïteit Ahold Delhaize (SCAD) foundation.

Chair of the Board of Directors of TELE2 AB 2013–2023. Lay Judge in the Enterprise Court of the Amsterdam Court of Appeal 2015–2022. Member of the Supervisory Board and Chair of the Audit Committee of ASML 2013–2021. Member of the Management Board of the Unilever Trust Office 2015–2019.

Kai Öistämö

b. 1964

President and CEO of Vaisala Corporation. Nokia Board member since 2022. Chair of the Corporate Governance and Nomination Committee and member of the Technology Committee.

PhD in computer science, Tampere University of Technology, Finland.

Chief Operating Officer of InterDigital, Inc. 2018–2020. Executive Partner, Siris Capital Group 2016–2018. EVP, Chief Development Officer, Nokia 2010–2014. EVP, Devices Nokia 2008–2010. EVP, Mobile Phones Business Group, Nokia 2006–2008. Several previous positions at Nokia since 1991.

Chairman of the Board of Fastems Group 2014–2022. Member of the Board of Directors of Sanoma Group 2010–2021. Chairman of the Board of Helvar Oy Ab 2014–2020. Member of the Board of Directors of Mavenir Plc. 2017–2018. Member of the Board of Directors of Digia / Qt Group Oy 2015–2018. Member of the Board of Directors of InterDigital, Inc. 2015–2018. Member of the Board of Directors of Oikian solutions Oy 2014–2018. Chairman of the Board, Tampere University 2013–2017. Chairman of the Board of Directors, Tekes 2012–2014. Member of the Board of Directors of Nokian Renkaat Oy 2008–2010.

Operations of the Board of Directors

The Board represents and is accountable to the shareholders of Nokia. While its ultimate statutory accountability is to the shareholders, the Board also takes into account the interests of Nokia's other stakeholders. The Board's responsibilities are active, not passive, and include the responsibility to evaluate the strategic direction of Nokia, its management policies and the effectiveness of the implementation of such by the management on a regular basis. It is the responsibility of the members of the Board to act in good faith and with due care, so as to exercise their business judgment on an informed basis, in a manner that they reasonably and honestly believe to be in the best interests of Nokia and its shareholders. In discharging this obligation, the members of the Board must inform themselves of all relevant information reasonably available to them. The Board and each Board Committee also have the power to appoint independent legal, financial or other advisors as they deem necessary. The Company will provide sufficient funding to the Board and to each Committee to exercise their functions and provide compensation for the services of their advisors.

The Board is ultimately responsible for, and its duties include, monitoring and reviewing Nokia's financial reporting process, the effectiveness of related control and audit functions and the independence of Nokia's external auditor, as well as monitoring the Company's statutory audit. The Board's responsibilities also include overseeing the structure and composition of our top management and monitoring legal compliance and the management of risks related to our operations. In doing so, the Board may set annual ranges and/or individual limits for capital expenditures, investments and divestitures and other financial and non-financial commitments that may not be exceeded without a separate Board approval.

In risk management, the Board's role includes risk analysis and assessment in connection with financial, strategy and business reviews, updates and decision-making proposals. Risk management policies and processes are an integral part of Board deliberations and risk-related updates are provided to the Board on a recurring basis. For a more detailed description of our risk management policies and processes, refer to "Risk management, internal control and internal audit functions at Nokia—Main features of risk management systems".

The Board has the responsibility for appointing and discharging the President, the Chief Executive Officer, Chief Financial Officer and Chief Legal Officer.

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The Board approves and the independent directors of the Board confirm the compensation and terms of employment of the President and CEO, subject to the requirements of Finnish law, upon the recommendation of the Personnel Committee of the Board. The compensation and terms of employment of the other Group Leadership Team members are approved by the Personnel Committee upon the recommendation of the President and CEO.

Board oversight of environmental and social activities and governance practices (ESG)

Under our Corporate Governance Guidelines, the Board evaluates Nokia's environmental and social activities and governance practices (ESG), related risks and target setting as well as their implementation and effectiveness in the Company. In 2022, the Board approved the new enhanced ESG strategy of the Company focusing on the environment, industrial digitalization, security & privacy, bridging the digital divide, and responsible business. The Board also reviewed the related risks and opportunities, approved the targets on climate change and diversity included in the short-term incentive program, monitored them and other ESG targets as well as the evolving ESG requirements and expectations, investor feedback and the disclosure approach.

In addition, the Board Committees monitor environmental and social developments and activities in the Company in their respective areas of responsibilities. During 2022, the Audit Committee's responsibilities included, amongst others, the implementation planning of new climate and other sustainability reporting requirements, as well as oversight of the ethics and compliance program and information and services security risks and maturity. The Audit Committee also annually reviews sustainability disclosures as well as the use of conflict minerals in Nokia's products presented in the annual reports and the related regulatory filings. The Personnel Committee assists the Board in the incorporation of the ESG related metrics in the incentive structures and oversees the human capital management, including personnel policies and practices related to Nokia culture, physical safety, employee wellbeing, diversity, recruiting, development and retention. The Corporate Governance and Nomination Committee assesses and advises the Board in the environmental, social and governance (ESG) related activities and practices aiming to enhance the governance structure supporting them. The Technology Committee has reviewed how the Company's new ESG strategy embeds into its technology strategy and roadmaps.

While the oversight of the security risks and their management, including cybersecurity, is a Board level responsibility in the Company, the detailed reviews of the different security domains are allocated to the Board's different committees. The responsibilities of the Audit Committee include oversight of the IT and services security risks and maturity. The Technology Committee oversees the product and customer security risk management. The oversight of the physical risks belongs to the Personnel Committee.

Key areas of focus for the Board's and its Committees' activities in 2022

The table below sets out a high-level overview of the key areas of focus for the Board's and its Committees' activities during the year.

	February	February/ March	April	May	July	September/ October	December
Board	<ul style="list-style-type: none"> - Business and financial reviews - Q4 and 2021 financials - Strategy - AGM proposals, incl. reinstating dividend - Share buyback program - Annual Policy and Charter review - Review of CEO's performance, targets and remuneration 	<ul style="list-style-type: none"> - Russian invasion of Ukraine - Annual report - Remuneration Report 2021 	<ul style="list-style-type: none"> - AGM and appointing Board Chair, Vice Chair and Committee members - Business and financial reviews - Strategy - Geopolitical update - Investor relations and corporate governance update - Q1 financials 	<ul style="list-style-type: none"> - Annual sustainability review - Business and financial reviews - Strategy - Ethics & compliance - Litigation update - Digitalization update 	<ul style="list-style-type: none"> - Business and financial reviews - Q2 financials - Strategy - Nokia innovation framework 	<ul style="list-style-type: none"> - Annual strategy meeting - External market perspective - Business and financial reviews - Group Leadership Team (GLT) succession planning - Q3 financials 	<ul style="list-style-type: none"> - Business and financial reviews - Strategy - Annual and long-range forecast and target setting - Board evaluation - Key risks review - Digitalization update - Investors' feedback on Nokia ESG
Corporate Governance and Nomination Committee	<ul style="list-style-type: none"> - AGM proposals on Board - composition and remuneration - Committee compositions - Corporate governance statement 			<ul style="list-style-type: none"> - AGM shareholder feedback - Planning of Board composition proposal 		<ul style="list-style-type: none"> - Corporate governance developments - Status of Board composition proposal - Board evaluation approach 	<ul style="list-style-type: none"> - Board remuneration review and benchmarking - Annual assessment of director commitments - Finalizing Board composition proposal to the AGM - Annual Charter review
Personnel Committee	<ul style="list-style-type: none"> - Incentive achievements for 2021 - CEO and GLT performance - Incentive targets and objectives for 2022 			<ul style="list-style-type: none"> - Culture - AGM shareholder feedback - GLT remuneration 	<ul style="list-style-type: none"> - Human capital risk review - PC Advisor's market and benchmarking update 	<ul style="list-style-type: none"> - Status of 2023 incentive and equity framework - Human capital update - GLT succession planning 	<ul style="list-style-type: none"> - 2023 incentive targets - 2023 equity plans - Investor and proxy advisor feedback - Planning of Remuneration Report for 2022 - Annual Charter review

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	- Nokia Equity Program proposal 2022					
Audit Committee	- Q4 and 2021 accounting	- Annual report for 2021, including ESG reporting	- Q1 accounting	- Q2 accounting	- Q3 accounting	- Treasury update
	- Auditor reporting	- Auditor reporting	- Auditor reporting	- Auditor reporting	- Auditor reporting	- Pensions update
	- Ethics and compliance, internal audit and internal controls updates	- Ethics and compliance, internal audit and internal controls updates	- Ethics and compliance, internal audit and internal controls updates	- Ethics and compliance, internal audit and internal controls updates	- Ethics and compliance, internal audit and internal controls updates	- Audit, internal audit and internal controls updates
	- AGM proposals to the Board	- Auditor reporting	- Cybersecurity; IT and service security	- Finance IT and digitalization	- ESG reporting developments	- Privacy program
			- Tax update			- Cybersecurity; IT and service security
			- Conflict Minerals Reporting			- Annual Charter and Policy review
Technology Committee	- Updates on major innovation and technology trends	- Cybersecurity; Group security update and approach	- Cybersecurity; product and customer security	- ESG technology strategy and roadmap	- Cybersecurity; product and customer security	
	- Review of strategic technology initiatives	- Review of strategic technology initiatives	- Updates on major innovation and technology trends	- Updates on major innovation and technology trends	- Review of strategic technology initiatives	- Review of strategic technology initiatives
	- Annual Charter review		- Review of strategic technology initiatives	- Review of strategic technology initiatives		

Board evaluation

In line with our Corporate Governance Guidelines, the Board conducts a comprehensive annual performance evaluation, which also includes evaluation of the Board Committees' work, the Board and Committee Chairs and individual Board members. The Board evaluation is conducted as a self-evaluation typically with a detailed questionnaire while an external evaluator is periodically engaged. Feedback is also requested from selected members of management as part of the Board evaluation process. The questions aim to measure and elicit feedback on the processes, structure, accountability, transparency, and effectiveness of the Board and to gain an overview of the issues that are areas of excellence, areas where the Board thinks greater focus is warranted and determining areas where the performance could be enhanced.

Each year, the results of the evaluation are discussed and analyzed by the entire Board and improvement actions are agreed based on such discussions. In 2022, the evaluation process was carried out as a self-evaluation using an external evaluation platform that included both numeric assessments and the possibility to provide more detailed written comments. The questionnaire comprised areas such as Nokia purpose and strategy, Board agenda and meetings, Board members' talent and culture, Board composition and dynamics as well as information, reporting and risk management.

Meetings of the Board of Directors

The Board of Directors constitutes a quorum if more than half of its members are present. The Board held 18 meetings excluding Committee meetings during 2022. In total nine (50%) of these meetings were regular meetings in person or by video connection. The other meetings were held in writing.

Directors' attendance at the Board and Committee meetings in 2022 is set forth in the table below:

Member	Board Meeting Attendance		Board and Committee Meeting Attendance ⁽¹⁾	
	Meetings	%	Meetings	%
Sari Baldauf (Chair)	18/18	100	27/27	100
Søren Skou (Vice Chair)	18/18	100	22/23	96
Bruce Brown	18/18	100	32/32	100
Thomas Dannenfeldt	18/18	100	30/30	100
Lisa Hook (as of 5 April 2022)	13/13	100	16/17	94
Jeanette Horan	17/18	94	27/29	93
Edward Kozel	18/18	100	29/29	100
Thomas Saueressig (as of 5 April 2022)	13/13	100	16/16	100
Carla Smits-Nusteling	18/18	100	28/28	100
Kari Stadigh (until 5 April 2022)	5/5	100	7/7	100
Kai Öistämö (as of 5 April 2022)	13/13	100	19/19	100
Average Attendance (%)		99		98

(1) Any director who so wishes may attend, as a non-voting observer, meetings of committees of which they are not members. Figures exclude directors attending committee meetings as non-voting observers.

Directors meet without the management in connection with each regularly scheduled meeting. According to Board practices, meetings without management present are only attended by non-executive directors. These meetings are chaired by the non-executive Chair of the Board. In case the non-executive Chair of the Board is unable to chair these meetings, the non-executive Vice Chair of the Board chairs the meeting. Additionally, the independent directors would meet separately at least once annually. In 2022, all members of the Board were non-executive and determined to be independent from Nokia and significant shareholders under the Finnish corporate governance standards and the rules of the NYSE.

Committees of the Board of Directors

The Board of Directors has four committees that assist the Board in its duties pursuant to their respective committee charters. The Board may also establish ad hoc committees for detailed reviews or consideration of particular topics to be proposed for the approval of the Board. Any director who so wishes may attend, as a non-voting observer, meetings of committees of which they are not members.

Board of Directors

Audit Committee	Corporate Governance and Nomination Committee	Personnel Committee	Technology Committee
Oversees the accounting and financial as well as non-financial reporting processes of Nokia and the audits of its financial statements as well as the internal controls and compliance program. In addition, oversees ESG related reporting requirements, IT and services security, privacy program as well as tax, treasury and pension activities.	Prepares the proposals for the general meetings in respect of the composition of the Board and the director remuneration to be approved by the shareholders, oversees the Directors' time commitments and independence and monitors issues and practices related to corporate governance and proposes necessary actions in respect thereof.	Oversees the human capital management related policies and practices at Nokia. Assists the Board in discharging its responsibilities in relation to all compensation and related matters, including remuneration policy and reporting, equity compensation, and remuneration of Nokia's executives and their terms of employment.	Follows major innovation and technology trends and reviews related key initiatives of Nokia. Oversees product and customer security.

The Audit Committee

The following table sets forth the members of the Audit Committee and their meeting attendance in 2022:

Member	Attendance (meetings)	Attendance (%)
Carla Smits-Nusteling (Chair)	6/6	100
Thomas Dannenfeldt	6/6	100
Lisa Hook (as of 5 April 2022)	3/4	75
Jeanette Horan	5/6	83
Edward Kozel	6/6	100
Average attendance (%)		92

The Committee consists of a minimum of three members of the Board who meet all applicable independence, financial literacy and other requirements as stipulated by Finnish law and the rules of Nasdaq Helsinki and the NYSE. As of 5 April 2022, the Audit Committee has consisted of the following five members of the Board: Carla Smits-Nusteling (Chair), Thomas Dannenfeldt, Lisa Hook, Jeanette Horan and Edward Kozel.

The Committee is responsible for assisting the Board in the oversight of:

- the quality and integrity of the Company's financial and non-financial reporting and related disclosures;
- the statutory audit of the Company's financial statements; including the sustainability reporting therein;
- the external auditor's qualifications and independence;
- the performance of the external auditor subject to the requirements of Finnish law;
- the performance of the Company's internal controls, risk management and the assurance function;
- the performance of the internal audit function;
- the Company's compliance with legal and regulatory requirements, including the performance of its ethics and compliance program;
- the monitoring and assessment of any related party transactions;
- the pension liabilities and taxation of the Company; and
- the processes and management related to the cybersecurity of the Company, including IT and services security.

In discharging its oversight role, the Audit Committee has full access to all Company books, records, facilities and personnel. The Audit Committee also maintains procedures for the receipt, retention and treatment of complaints received by Nokia regarding accounting, internal controls, or auditing matters and for the confidential, anonymous submission by our employees of concerns relating to accounting or auditing matters. Nokia's disclosure controls and procedures, which are reviewed by the Audit Committee and approved by the President and CEO and the Chief Financial Officer, as well as the internal controls over financial reporting, are designed to provide reasonable assurance regarding the quality and integrity of Nokia's financial statements and related disclosures. For further information on internal control over financial reporting, refer to "Risk management, internal control and internal audit functions at Nokia—Description of internal control procedures in relation to the financial reporting process".

Under the Finnish Companies Act, an external auditor is elected by a simple majority vote of the shareholders at the Annual General Meeting for one year at a time. The Audit Committee prepares the proposal to the shareholders, upon its evaluation of the qualifications and independence of the external auditor, of the nominee for election or re-election. Under Finnish law, the fees of the external auditor are also approved by the shareholders by a simple majority vote at the Annual General Meeting. The Committee prepares the proposal to the shareholders in respect of the fees of the external auditor, and approves the external auditor's annual audit fees under the guidance given by the Annual General Meeting. For information about the fees paid to Nokia's external auditor, Deloitte Oy, during 2022 refer to "Auditor fees and services" below.

The Board has determined that all members of the Audit Committee, including its Chair, Carla Smits-Nusteling, are "audit committee financial experts" as defined in the requirements of Item 16A of the Annual Report on Form 20-F filed with the U.S. Securities and Exchange Commission (SEC). Carla Smits-Nusteling and each of the other members of the Audit Committee are "independent directors" as defined by Finnish law, the Finnish Corporate Governance Code and in Section 303A.02 of the NYSE Listed Company Manual.

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The Audit Committee meets a minimum of four times a year. The Committee meets separately with the representatives of Nokia's management, heads of the internal audit, and ethics and compliance functions, and the external auditor in connection with each regularly scheduled meeting. The head of the internal audit function has, at all times, direct access to the Audit Committee, without the involvement of management.

Audit Committee pre-approval policies and procedures

The Audit Committee of the Board is responsible, among other matters, for oversight of the external auditor's independence, subject to the requirements of applicable legislation. The Audit Committee has adopted a policy regarding an approval procedure of audit services performed by the external auditors of the Nokia Group and permissible non-audit services performed by the principal external auditor of the Nokia Group (the "Pre-approval Policy").

Under the Pre-approval Policy, proposed services either: (i) may be pre-approved by the Audit Committee in accordance with certain service categories described in the Pre-approval Policy (general pre-approval); or (ii) require the specific pre-approval of the Audit Committee (specific pre-approval). The Pre-approval Policy sets out the audit, audit-related, tax and other services that have received the general pre-approval of the Audit Committee. All other audit, audit-related (including services related to internal controls and significant mergers and acquisitions projects), tax and other services are subject to specific pre-approval by the Audit Committee. All service requests concerning generally pre-approved services are submitted to an appointed Audit Committee delegate within management, who determines whether the services are within the generally pre-approved services. The Pre-approval Policy is subject to annual review by the Audit Committee.

The Audit Committee establishes budgeted fee levels annually for each of the categories of audit and non-audit services that are pre-approved under the Pre-approval Policy, namely, audit, audit-related, tax and other services. At each regular meeting of the Audit Committee, the auditor provides a report in order for the Audit Committee to review the services that the auditor is providing, as well as the cost of those services.

The Corporate Governance and Nomination Committee

The following table sets forth the members of the Corporate Governance and Nomination Committee and their meeting attendance in 2022:

Member	Attendance (meetings)	Attendance (%)
Kai Öistämö (Chair) (as of 5 April 2022)	3/3	100
Sari Baldauf	4/4	100
Bruce Brown	4/4	100
Carla Smits-Nusteling	4/4	100
Kari Stadigh (until 5 April 2022)	1/1	100
Average attendance (%)		100

The Committee consists of three to five members of the Board who meet all applicable independence requirements as stipulated by Finnish law and the rules of Nasdaq Helsinki and the NYSE. As of 5 April 2022 the Corporate Governance and Nomination Committee has consisted of the following four members of the Board: Kai Öistämö (Chair), Sari Baldauf, Bruce Brown and Carla Smits-Nusteling.

The Committee fulfills its responsibilities by:

- actively identifying individuals qualified to be elected members of the Board as well as considering and evaluating the appropriate level and structure of director remuneration;
- preparing and evaluating the principles regarding Board diversity;
- preparing proposals to the shareholders on the director nominees for election at the general meetings as well as director remuneration;
- monitoring significant developments in the law and practice of corporate governance, including the sustainability-related governance trends and of the directors' duties and responsibilities;
- assisting the Board and each Committee of the Board in its annual performance evaluations, including establishing criteria to be applied in connection with such evaluations;
- developing and administering Nokia's Corporate Governance Guidelines and giving recommendations regarding them to the Board; and
- reviewing Nokia's disclosure in the corporate governance statement.

The Committee has the power and practice to appoint a recruitment firm to identify appropriate new director candidates.

The Personnel Committee

The following table sets forth the members of the Personnel Committee and their meeting attendance in 2022:

Member	Attendance (meetings)	Attendance (%)
Bruce Brown (Chair)	5/5	100
Sari Baldauf	5/5	100
Thomas Dannenfeldt (as of 5 April 2022)	4/4	100
Søren Skou	4/5	80
Kari Stadigh (until 5 April 2022)	1/1	100
Average attendance (%)		96

The Committee consists of a minimum of three members of the Board who meet all applicable independence requirements as stipulated by Finnish law and the rules of Nasdaq Helsinki and the NYSE. As of 5 April 2022 the Personnel Committee has consisted of the following four members of the Board: Bruce Brown (Chair), Sari Baldauf, Thomas Dannenfeldt and Søren Skou.

The Committee has overall responsibility for evaluating, resolving and making recommendations to the Board regarding:

- preparing the Remuneration Policy and the Remuneration Report;
- compensation and terms of employment of the Company's senior management;
- human capital management;
- all equity-based plans;

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- incentive compensation plans, policies and programs of the Company affecting executives; and
- possible other significant incentive plans.

The Committee is responsible for preparing the Remuneration Policy, including Nokia's compensation philosophy and principles and ensuring that the Company's compensation programs are performance-based, designed to contribute to long-term shareholder value creation in line with shareholders' interests, properly motivate management, are aligned with the Remuneration Policy as well as support overall corporate strategies.

The Committee also oversees human capital management and periodically reviews the personnel policies and practices of Nokia related to human capital management and social responsibilities relating to its employees, including Company culture, physical safety, employee wellbeing, morale, diversity, equity and inclusion, talent management and development, succession planning, resourcing, recruiting, attrition, retention and employee engagement.

The Technology Committee

The following table sets forth the members of the Technology Committee and their meeting attendance in 2022:

Member	Attendance (meetings)	Attendance (%)
Edward Kozel (Chair)	5/5	100
Bruce Brown	5/5	100
Jeanette Horan	5/5	100
Thomas Saueressig (as of 5 April 2022)	3/3	100
Kai Öistämö (as of 5 April 2022)	3/3	100
Thomas Dannenfeldt (until 5 April 2022)	2/2	100
Average attendance (%)		100

The Committee consists of a minimum of three members of the Board who meet applicable independence requirements as stipulated by Finnish law and the rules of Nasdaq Helsinki and the NYSE and have such skills in innovation, technology and science matters as the Board determines adequate from time to time. As of 5 April 2022 the Technology Committee has consisted of the following five members of the Board: Edward Kozel (Chair), Bruce Brown, Jeanette Horan, Thomas Saueressig and Kai Öistämö.

In its dialogue with and provision of opinions and advice to the management, the Committee will periodically review:

- the Company's technological competitiveness and new strategic technology initiatives as well as market trends, considering both organic as well as inorganic options to retain or attain competitiveness;
- the Company's approach to major technological innovations;
- key technology trends that may result in disruptive threats or opportunities and the proposals on how to adequately address them;
- high-level risks and opportunities associated with the Company's Research and Development Programs;
- embedding sustainability in the technology roadmaps; and
- the processes and management related to the cybersecurity of the Company, including product and customer security.

Group Leadership Team and the President and CEO

The Group Leadership Team is responsible for the operative management of Nokia. The Group Leadership Team is chaired by the President and CEO. The President and CEO's rights and responsibilities include those allotted to the President under Finnish law.

On 31 December 2022, the Group Leadership Team consisted of 10 members, including the President and CEO, representing six different nationalities. In total 30% of the Group Leadership Team members were female. In addition to biographical information of the Group Leadership team members, the table below sets forth the number of shares and ADSs held by the members as at 31 December 2022, a total of 3 612 050 Nokia shares. These holdings represented approximately 0.06% of our total shares and voting rights excluding shares held by the Nokia Group.

Name	Position	Gender	Year of birth	Nationality	On GLT since	Shares ⁽¹⁾	ADSs ⁽¹⁾
Pekka Lundmark	President and CEO	Male	1963	Finnish	2020	1 289 304	
Nishant Batra	Chief Strategy and Technology Officer	Male	1978	Indian	2021	507 531	
Ricky Corker	Chief Customer Experience Officer	Male	1967	Australian	2019	361 554	
Federico Guillén	President of Network Infrastructure	Male	1963	Spanish	2016	406 408	
Amy Hanlon-Rodemich	Chief People Officer	Female	1972	American	2022	–	
Jenni Lukander	President of Nokia Technologies	Female	1974	Finnish	2019	76 788	
Raghav Sahgal	President of Cloud and Network Services	Male	1962	American	2020	473 310	
Melissa Schoeb	Chief Corporate Affairs Officer	Female	1968	American	2021	127 342	
Tommi Uitto	President of Mobile Networks	Male	1969	Finnish	2019	139 559	
Marco Wirén	Chief Financial Officer	Male	1966	Finnish/Swedish	2020	230 254	

1) At 31 December 2022, no ADSs were held by the Group Leadership Team members. The number of shares or ADSs includes shares and ADSs received as compensation as well as shares and ADSs acquired through other means. Stock options or other equity awards that are deemed as being beneficially owned under the applicable SEC rules are not included.

At present, our Group Leadership Team consists of 11 members, following the appointment of Esa Niinimäki as Chief Legal Officer in January 2023. The current Group Leadership Team has a representation of six different nationalities and 27% of the members are female.

Biographical details of the current members of the Nokia Group Leadership Team

Pekka Lundmark

b. 1963

President and Chief Executive Officer (CEO) since 2020. Rejoined Nokia in 2020.

Master of Science, Department of Technical Physics, Helsinki University of Technology, Finland.

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President and CEO, Fortum Corporation, 2015–2020. President and CEO, Konecranes Plc, 2005–2015 and Group Executive Vice President 2004–2005. President and CEO, Hackman Oyj, 2002–2004. Managing Partner, Startupfactory 2000–2002. Various executive positions at Nokia 1990–2000.

Commissioner, Broadband Commission for Sustainable Development. Member of the Board, Research Institute of the Finnish Economy (ETLA) and Finnish Business and Policy Forum (EVA). International Member of the Academy, Royal Swedish Academy of Engineering Sciences (IVA). Member of the Board, Finnish Athletics Federation.

Chairman of the Board, Confederation of Finnish Industries 2019–2020. Member of the Board, East Office of Finnish Industries 2009–2020. Chairman of the Board, Finnish Energy 2016–2018.

Nishant Batra

b. 1978

Chief Strategy and Technology Officer (CSTO). Group Leadership Team member since 2021. Joined Nokia in 2021.

MBA from INSEAD. Master's degrees in Telecommunications and in Computer Science, Southern Methodist University, Dallas, the United States. Bachelor's degree in Computer Applications, Devi Ahilya University, Indore, Madhya Pradesh, India.

Executive Vice President and Chief Technology Officer, Veoneer Inc. 2018–2021. Prior to Veoneer Inc. held several senior positions at Ericsson 2006–2018 in the United States, Sweden and India.

Member of the Board of Directors of Sensys Gatso Group 2020–2022.

Ricky Corker

b. 1967

Chief Customer Experience Officer (CCXO). Group Leadership Team member since 2019. Joined Nokia in 1993.

Bachelor in Communications and Electronic Engineering from the Royal Melbourne Institute of Technology, Australia.

President of Customer Operations, Americas, Nokia 2019–2020. Executive Vice President and President of North America, Nokia 2011–2018. Head of Asia Pacific, Nokia Siemens Networks 2009–2011. Head of Asia North Region, Nokia Siemens Networks 2008–2009. Head of Hutchison Global Customer Business Team, Nokia Siemens Networks 2007–2008. Vice President Asia Pacific, Nokia Networks 2005–2007. Lead Sales Director Asia Pacific, Nokia Networks 2004–2005. Account Director Telstra, Nokia Networks 2002–2003. Account Director Vodafone Australia and New Zealand, and Sales Director Vodafone Asia Pacific Customer Business Team, Nokia Networks 2001–2002. Commercial Director Global Accounts British Telecom, Nokia Networks 2001. Senior sales and marketing positions at Nokia 1993–2001.

Federico Guillén

b. 1963

President of Network Infrastructure. Group Leadership Team member since 2016. Joined Nokia in 2016.

Degree in Telecommunications Engineering, ETSIT at Universidad Politécnica de Madrid, Spain. Master's degree in Switching & Communication Architectures, ETSIT at Universidad Politécnica de Madrid, Spain. Master's Degree in International Management, ESC Lyon and Alcatel, France.

President of Customer Operations, Europe, Middle East & Africa and Asia Pacific, Nokia 2018–2020. President of Fixed Networks, Nokia 2016–2018. President of Fixed Networks, Alcatel-Lucent 2013–2016. President and Chief Senior Officer of Alcatel-Lucent Spain and Global Account Manager Telefónica, Alcatel-Lucent 2009–2013. Vice President Sales of Vertical Market Sales in Western Europe, Alcatel-Lucent 2009. Head of Regional Support Center, Fixed Access Division for South Europe, Middle East & Africa, India and Caribbean & Latin America, Alcatel-Lucent 2007–2009. President and Chief Senior Officer, Alcatel Mexico and Global Account Manager, Telmex 2003–2007. Various R&D, portfolio and sales management positions with Teletra in Spain, and with Alcatel in Spain, Belgium and the United States 1989–2003.

Amy Hanlon-Rodemich

b. 1972

Chief People Officer (CPO). Group Leadership Team member since 2022. Joined Nokia in 2022.

Master of Human Resources and Organizational Development, University of San Francisco, the United States. Bachelor of Arts in English, Tufts University, Boston, the United States.

Chief People Officer, GlobalLogic, a Hitachi Group Company 2019–2022. Vice President, Human Resources, Synopsys, Inc. 2017–2019. Executive Vice President, People Success, Milestone Technologies 2016–2017. Director and Global HR Head, Yahoo 2013–2016. Various positions such as Senior HR Business Partner, Senior Manager, Director, Global Talent Development Operations, VMware 2004–2013. Employee Relations Specialist, Technology Credit Union 2003–2004. Human Resources Manager, CAT Technology 2000–2003. Manager, Staffing Programs, Inktomi Corporation 1996–2000.

Member of the Board, Exceptional Women Awardees Foundation. Advisory Board member, Topia, Inc. Advisory Board Member, BrightPlan. Co-Chair and Governing Board Member, CHRO Executive Summit (Evanta). Board Member, Bay Area Executive Development Network.

Jenni Lukander

b. 1974

President of Nokia Technologies. Group Leadership Team member since 2019. Joined Nokia in 2007.

Master of Laws, University of Helsinki, Finland.

Senior Vice President, Head of Patent Business, Nokia 2018–2019. Vice President, Head of Patent Licensing, Nokia 2018. Vice President, Head of Litigation and Competition Law, Nokia 2016–2018. Director, Head of Regulatory and Competition Law, Nokia 2015–2016. Director, Head of Competition Law, Nokia 2011–2015. Senior Legal Counsel, Nokia 2007–2011. Visiting lawyer, Nokia 2001. Lawyer, Roschier Ltd. 1999–2007.

Esa Niinimäki

b. 1976

Chief Legal Officer (CLO) and Board Secretary (CLO). Group Leadership Team member since 2023. Joined Nokia in 2007.

Master of Laws, Fordham University, School of Law, New York, the United States. Master of Laws, University of Helsinki, Finland.

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Interim Chief Legal Officer, Nokia 2022–2023. Deputy Chief Legal Officer, Vice President, Corporate Legal and Board Secretary, Nokia 2018–2023. General Counsel, Global Services, Nokia 2015–2018. Head of Corporate Legal, Nokia Solutions and Networks and Head of Finance & Labor Legal, Nokia 2013–2015. Senior Legal Counsel, Legal and IP, India, Middle East and Africa, Nokia 2012–2013. (Senior) Legal Counsel, Corporate Legal, Nokia 2007–2011. Group Legal Counsel, Metsä Group 2005–2007. Associate Lawyer, White & Case LLP 2003–2005.

Member of the Market Practice Board of Securities Market Association, Finland; the Advisory Board of the Finnish Listed Companies; the Legal Affairs Committee of the Confederation of Finnish Industries and the Policy Committee of the Directors' Institute of Finland.

Raghav Sahgal

b. 1962

President of Cloud and Network Services. Group Leadership Team member since 2020. Joined Nokia in 2017.

Master of Science in Computer Systems Management, University of Maryland, the United States. Bachelor of Science in Computer Engineering, Tulane University, New Orleans, the United States. Executive Business Certificate in General Management, Harvard University, the United States.

President of Nokia Enterprise 2020. Senior Vice President, Nokia Software 2017–2020. President, NICE Ltd. Asia Pacific and the Middle East 2010–2017. Advisory Board Member, Orga Systems 2010–2014. Vice President, Communications Business Unit, Asia Pacific & Japan, Oracle 2008–2010. Chief Business Officer, Comverse 2005–2006. Executive Vice President, Asia Pacific, CSG 2002–2005. Vice President, Software Products Group Asia Pacific, Lucent Technologies 2000–2002.

Melissa Schoeb

b. 1968

Chief Corporate Affairs Officer (CCAO). Group Leadership Team member since 2021. Joined Nokia in 2021.

Bachelor of Arts in International Relations and Spanish, University of Mary Washington, Virginia, the United States. Fellowship Recipient, Four Freedoms Foundation, Rome, Italy.

Vice President, Corporate Affairs, Occidental 2017–2021. Vice President, Communications and Public Affairs, Occidental 2012–2017. Senior Director, Communications and Public Affairs, Occidental 2007–2012. Senior Vice President and Senior Partner, General Manager and other senior positions, FleishmanHillard 2002–2007. Director of Global Communications, Nortel Networks 2000–2002. Vice President, Technology, FleishmanHillard 1998–2000. Business Director, The VenCom Group Inc. 1995–1997. Consultant, London, the United Kingdom and Washington D.C., the United States, Gemini Consulting 1991–1995.

Member of the Arthur Page Society and The Seminar. Member of Mary Washington University College of Business Executive Advisory Board.

Tommi Uitto

b. 1969

President of Mobile Networks. Group Leadership Team member since 2019. Joined Nokia in 1996.

Master's degree in industrial management, Helsinki University of Technology, Finland. Master's degree in operations management, Michigan Technological University, the United States.

Senior Vice President, Global Product Sales, Mobile Networks, Nokia 2016–2018. Senior Vice President, Global Mobile Broadband Sales, Customer Operations, Nokia Networks 2015–2016. Senior Vice President, West Europe, Customer Operations, Nokia Networks 2013–2015. Head of Radio Cluster (Senior Vice President), Mobile Broadband, Nokia Siemens Networks 2012–2013. Head of Global LTE Radio Access Business Line (Vice President) and Quality, Mobile Broadband Nokia Siemens Networks, 2011–2012. Head of Product Management, Network Systems, Nokia Siemens Networks 2010. Head of Product Management, Radio Access, Nokia Siemens Networks 2009. Head of WCDMA/HSPA and Radio Platforms Product Management, Nokia Siemens Networks 2008. Head of WCDMA/HSPA Product Line Management, Nokia Siemens Networks 2007. General Manager, Radio Controller Product Management Nokia Networks, 2005–2007. Director, Sales & Marketing (Lead Sales Director), France Telecom/Orange Nokia Networks 2002–2005. Operations Director, Northeast Europe, Central & Eastern Europe and Middle East, Nokia Networks 1999–2002.

Marco Wirén

b. 1966

Chief Financial Officer (CFO). Group Leadership Team member since 2020. Joined Nokia in 2020.

Master's degree in Business Administration, University of Uppsala, Sweden. Studies in management and strategic leadership, including at Duke Business School, the United States; IMD, Switzerland and Stockholm School of Economics, Sweden.

President, Wärsilä Energy and Executive Vice President, Wärsilä Group 2018–2020. Executive Vice President and CFO, Wärsilä Group 2013–2018. Executive Vice President and CFO, SSAB Group 2008–2013. Vice President, Business Control, SSAB Group 2007–2008. CFO, Eltel Networks 2006–2007. Vice President of Business development, Eltel Networks 2004–2005. Head of Service Division, Eltel Networks 2003–2004. Vice President, Corporate Development, Eltel Networks 2002–2003. Vice President, Strategy & Business Development, NCC Group 1999–2002. Head of Strategic Planning, NCC Group 1998–1999. Group Controller, NCC Group 1996–1998.

Vice Chair of the Board of Directors of Neste Corporation 2019–2023 and member of the Board of Directors of Neste Corporation 2015–2023.

Summary of changes in the Group Leadership Team in 2022 and thereafter

The following members stepped down from the Group Leadership Team:

- Stephanie Werner-Dietz; Chief People Officer, as of 31 August 2022; and
- Nassib Abou-Khalil, Chief Legal Officer, as of 6 October 2022.

The Group Leadership Team was complemented with two new appointments:

- Amy Hanlon-Rodemich, Chief People Officer, effective as of 24 October 2022; and
- Esa Niinimäki, Chief Legal Officer, effective as of 25 January 2023.

Risk management, internal control and internal audit functions at Nokia

Main features of risk management systems

We have a systematic and structured approach to risk management. Key risks and opportunities are primarily identified against business targets either in business operations or as an integral part of strategy and financial planning. Risk management covers strategic, operational, financial, compliance and hazard risks. Key risks and opportunities are analyzed, managed and monitored as part of business performance management.

The principles documented in the Nokia Enterprise Risk Management Policy, which is approved by the Audit Committee of the Board, require risk management and its elements to be integrated into key processes. One of the core principles is that the business or function head is also the risk owner, although all employees are responsible for identifying, analyzing and managing risks, as appropriate, given their roles and duties. Our overall risk management concept is based on managing the key risks that would prevent us from meeting our objectives, rather than focusing on eliminating all risks. In addition to the principles defined in the Nokia Enterprise Risk Management Policy, other key policies reflect implementation of specific aspects of risk management.

Overseeing risk is an integral part of the Board's deliberations. Key risks and opportunities are reviewed by the Group Leadership Team and the Board in order to create visibility on business risks as well as to enable prioritization of risk management activities. The Board's Audit Committee is responsible for, among other matters, risk management relating to the financial reporting process and assisting the Board's oversight of the risk management function. The Board's role in overseeing risk includes risk analysis and assessment in connection with financial, strategy and business reviews, updates and decision-making proposals.

Description of internal control procedures in relation to the financial reporting process

The management is responsible for establishing and maintaining adequate internal control over Nokia's financial reporting. Our internal control over financial reporting is designed to provide reasonable assurance to the management and the Board regarding the reliability of financial reporting and the preparation and fair presentation of published financial statements.

The management conducts a yearly assessment of Nokia's internal controls over financial reporting in accordance with the Committee of Sponsoring Organizations framework (the "COSO framework", 2013) and the Control Objectives for Information and Related Technology (COBIT) framework of internal controls. The assessment is performed based on a top-down risk assessment of our financial statements covering significant accounts, processes and locations, corporate-level controls and information systems' general controls.

As part of its assessment, the management has documented:

- the corporate-level controls, which create the "tone from the top" containing the Nokia values and Code of Conduct and which provide discipline and structure to decision-making processes and ways of working. Selected items from our operational mode and governance principles are separately documented as corporate-level controls;
- the significant processes: (i) give a complete end-to-end view of all financial processes; (ii) identify key control points; (iii) identify involved organizations; (iv) ensure coverage for important accounts and financial statement assertions; and (v) enable internal control management within Nokia;
- the control activities, which consist of policies and procedures to ensure the management's directives are carried out and the related documentation is stored according to our document retention practices and local statutory requirements; and
- the information systems' general controls to ensure that sufficient IT general controls, including change management, system development and computer operations, as well as access and authorizations, are in place.

Further, the management has also:

- assessed the design of the controls in place aimed at mitigating the financial reporting risks;
- tested operating effectiveness of all key controls; and
- evaluated all noted deficiencies in internal controls over financial reporting in the interim and as of year-end.

In 2022, Nokia has followed the procedures as described above and has reported on the progress and assessments to the management and to the Audit Committee of the Board on a quarterly basis.

Description of the organization of the internal audit function

We also have an internal audit function that examines and evaluates the adequacy and effectiveness of our system of internal control. Internal audit reports to the Audit Committee of the Board. The head of the internal audit function has direct access to the Audit Committee, without involvement of the management. The internal audit staffing levels and annual budget are approved by the Audit Committee. All authority of the internal audit function is derived from the Board. The internal audit aligns to the business by business group and function.

Annually, an internal audit plan is developed with input from the management, taking into account key business risks and external factors. This plan is approved by the Audit Committee. Audits are completed across the business focusing on site level, customer level, business project level, IT system implementation, IT security, operations activities or at a Group function level. The results of each audit are reported to the management identifying issues, financial impact, if any, and the correcting actions to be completed. Quarterly, the internal audit function communicates the progress of the internal audit plan completion, including the results of the closed audits, to the Audit Committee.

Internal audit also works closely with our Ethics and Compliance office to review any financial concerns brought to light from various channels and, where relevant, works with Enterprise Risk Management to ensure priority risk areas are reviewed through audits.

In 2022, the internal audit plan was materially completed. Due to some continued COVID-19 impacts, a small number of audits had to be rescheduled to 2023. The results of all completed reviews, as well as the rescheduling to 2023 were reported to management and to the Audit Committee.

Related party transactions

We determine and monitor related parties in accordance with the International Accounting Standards (IAS 24, Related Party Disclosures) and other applicable regulations including the applicable U.S. securities laws. We maintain information on our related parties as well as monitor and assess related party transactions. As a main principle, all transactions should be conducted at arm's-length and as part of the ordinary course of business.

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In exceptional cases where these principles would be deviated from, Nokia would set up a separate process to determine the related parties in question and to seek relevant approvals in accordance with internal guidelines and applicable regulations.

Main procedures relating to insider administration

Our insider administration is organized according to the applicable European Union and Finnish laws and regulations as well as applicable U.S. securities laws and regulations. In addition, the Board of Directors has approved the Nokia Insider Policy, which sets out Nokia-wide rules and practices to ensure full compliance with applicable rules and that inside information is recognized and treated in an appropriate manner and with the highest integrity. The Nokia Insider Policy is applicable to all directors, executives and employees of Nokia.

Persons discharging managerial responsibilities

Nokia has identified members of the Board of Directors and the Group Leadership Team as persons discharging managerial responsibilities who, along with persons closely associated with them, are required to notify Nokia and the Finnish Financial Supervisory Authority of their transactions with Nokia's financial instruments. Nokia publishes the transaction notifications.

In addition, according to the Nokia Insider Policy, persons discharging managerial responsibilities are obligated to clear with the Head of Corporate Legal a planned transaction in Nokia's financial instruments in advance. It is also recommended that trading and other transactions in Nokia's financial instruments are carried out in times when the information available to the market is as complete as possible.

Closed window

Persons discharging managerial responsibilities are subject to a closed window period of 30 calendar days preceding the disclosure of Nokia's quarterly or annual result announcements, as well as the day of the disclosure. During the closed window period, persons discharging managerial responsibilities are prohibited from dealing in Nokia's financial instruments.

Nokia has imposed this closed window period also on separately designated financial reporting persons who are recurrently involved with the preparation of Nokia's quarterly and annual results announcements. These persons are separately notified of their status as designated financial reporting persons.

Insider registers

Nokia does not maintain a permanent insider register. Insiders are identified on a case-by-case basis for specific projects and are notified of their insider status. Persons included in a project-specific insider register are prohibited from dealing in Nokia's financial instruments until the project ends or is made public.

Supervision

Our insider administration's responsibilities include internal communications related to insider matters and trading restrictions, setting up and maintaining our insider registers, arranging related trainings as well as organizing and overseeing compliance with the insider rules.

Violations of the Nokia Insider Policy must be reported to the Head of Corporate Legal. Nokia employees may also use channels stated in the Nokia Code of Conduct for reporting incidents involving suspected violations of the Nokia Insider Policy.

Auditor fees and services

Deloitte Oy, based in Helsinki, Finland, served as our auditor for the financial year ended 31 December 2022 and for the financial year ended 31 December 2021. The auditor is elected annually by our shareholders at the Annual General Meeting for the financial year commencing next after the election. On an annual basis, the Audit Committee of the Board prepares a proposal to the shareholders regarding the appointment of the auditor based upon its evaluation of the qualifications and independence of the auditor to be proposed for election.

The following table presents fees by type paid to Deloitte's network of firms for the years ended 31 December:

EURm	2022	2021
Audit fees ⁽¹⁾	22.7	22.0
Audit-related fees ⁽²⁾	0.8	1.9
Tax fees ⁽³⁾	0.4	0.2
All other fees ⁽⁴⁾	0.2	0.1
Total	24.1	24.2

(1) Audit fees consist of fees incurred for the annual audit of the Group's consolidated financial statements and the statutory financial statements of the Group's subsidiaries.

(2) Audit-related fees consist of fees billed for assurance and related services that are reasonably related to the performance of the audit or review of the Group's financial statements or that are traditionally performed by the independent auditor, and include consultations concerning financial accounting and reporting standards; advice and assistance in connection with local statutory accounting requirements; due diligence related to mergers and acquisitions; and audit procedures in connection with investigations in the pre-litigation phase and compliance programs. They also include fees billed for other audit services, which are those services that only the independent auditor can reasonably provide, and include the provision of comfort letters and consents in connection with statutory and regulatory filings and the review of documents filed with the SEC and other capital markets or local financial reporting regulatory bodies.

(3) Tax fees include fees billed for: (i) services related to tax compliance including preparation and/or review of tax returns, preparation, review and/or filing of various certificates and forms and consultation regarding tax returns and assistance with revenue authority queries; compliance reviews, advice and assistance on other indirect taxes; and transaction cost analysis; (ii) services related to tax audits; (iii) services related to individual compliance (preparation of individual tax returns and registrations for employees (non-executives), assistance with applying visa, residency, work permits and tax status for expatriates); (iv) services related to technical guidance on tax matters; (v) services related to transfer pricing advice and assistance with tax clearances; and (vi) tax consultation and planning (advice on stock-based remuneration, local employer tax laws, social security laws, employment laws and compensation programs and tax implications on short-term international transfers).

(4) Other fees include fees billed for Company establishments; liquidations; forensic accounting, data security, other consulting services and reference materials and services.

Compensation

This section sets out our remuneration governance, policies and how they have been implemented within Nokia. It includes our Remuneration Report where we disclose the compensation of our Board members and the President and CEO for 2022 and which will be presented to an advisory vote at the Annual General Meeting 2023. A standalone version is published on a stock exchange release.

Other compensation-related information provided alongside the Remuneration Report is not subject to a vote at the Annual General Meeting 2023, but provides added information on the compensation policies applied within Nokia as well as on the compensation of the rest of the Group Leadership Team.

We report information applicable to executive compensation in accordance with Finnish regulatory requirements and with requirements set by the U.S. Securities and Exchange Commission that are applicable to us.

Highlights

- While 2021 was a year of reset, with major changes in strategy, operating model, organization design and culture, 2022 was a year of acceleration for Nokia, and the business achieved strong financial results, reflected in a proposal to increase the dividend authorization at the Annual General Meeting 2023.
- As President and CEO, Pekka Lundmark had no change to his base salary and target compensation in 2022, and his short-term incentive payment of 144% of target reflects Nokia's strong performance against objectives set by the Board.
- Pekka Lundmark spent a significant amount of time in North America in 2022, reflecting the importance of the North American market and its home to key enterprise and webscale companies that we partner with. While temporarily based out of Nokia's California office, Pekka Lundmark met in-person with many key customers in North and South America, built networks within the U.S. technology industry and deepened government relations.
- The 2020 Performance share plan grants to Pekka Lundmark and other Global Leadership Team (GLT) members were made in the second half of 2020, and accordingly, performance outcomes for the three-year period will be known in the second half of 2023 after the end of the performance period.
- Reflecting the input from investors, the 2023 metrics for the long-term incentive plan (Performance shares) for Pekka Lundmark and the rest of the GLT will change from 100% absolute total shareholder return (absolute TSR) to a blend of two-thirds absolute TSR and one-third relative total shareholder return (relative TSR) against our comparator group.
- To bring greater focus to the important ESG topics of carbon emission reduction and gender diversity, the Board has decided that for the 2023 short-term incentive, the ESG weighting will increase from 10% to 20% for the President and CEO, and the rest of the GLT with a corresponding reduction in their strategic objectives.
- For 2023, as a result of Nokia's continued growth and strong business performance it was decided by the Board to increase the President and CEO's base salary by 3.5%, which is lower than Nokia's 2022 average global salary increase for the general employee population.

Word from the Chair of the Personnel Committee of the Board

Dear Fellow Shareholder,

I am delighted to present this year's compensation report, in a year where Nokia delivered clear acceleration in results across the business and a broadened customer base through strong growth in Enterprise.

Business context

As the Letter from our President and CEO sets out in more detail, 2022 was a year when Nokia successfully executed its business strategy and delivered on its commitment of an acceleration in business results. Our continued use in 2022 of a long-term performance metric based on shareholder return ensures that shareholders and executives are aligned for the short- and long-term and there are direct links between executive compensation and shareholder value creation. In 2022, we maintained the compensation approach set by the Remuneration policy approved by shareholders in 2020. The Remuneration Report, and all elements of the compensation delivered in 2022, are fully consistent with the approved policy.

For 2023, we will strengthen this alignment with the Performance shares awarded being based on two-thirds absolute TSR and one-third relative TSR, against our established comparator group. The comparator group that we adopted last year has worked well and will be used as the comparator group for the relative TSR calculation in the 2023 Performance shares. During 2023, we will continue to regularly engage with key shareholders to discuss their views on our compensation policies, programs and associated disclosures, and will reflect on their insights when proposing to the Annual General Meeting 2024 the Remuneration Policy and in preparing Nokia's equity plan for 2024–2026.

Strategy and compensation

At the core of Nokia's philosophy lie two principles:

- pay for performance and aligning the interests of employees with shareholders; and

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- ensuring that compensation programs and policies support the delivery of the corporate strategy and create long-term sustainable shareholder value.

Shareholder outreach

We were pleased that the remuneration report received 93% support as part of an advisory vote in the Annual General Meeting in 2022, and that 97% support was received for the revised fees to Directors. During 2022 we also met with 13 of our largest shareholders and several other key stakeholders, discussing a range of issues, primarily focused on ESG and equity topics. These meetings have helped to inform our views and strengthen our belief that ESG measures are one of the core components of our incentive plans and have led to us increasing the proportion of ESG weighting in the annual short-term incentive for the President and CEO and the GLT members to 20%.

CEO compensation

During 2022, there was no increase to Pekka Lundmark's base salary and target incentives.

- Pekka Lundmark's bonus for 2022 was at 144% of target totaling EUR 2 342 438, reflecting the strong acceleration in Nokia's overall business performance.
- The second tranche of Pekka Lundmark's restricted shares, awarded to him in 2020 in respect of forfeited compensation from his previous employer, vested in October 2022. This tranche totaled 117 467 shares. The third and final tranche is due in 2023 subject to his continued service.

For 2023, as a result of Nokia's continued growth and strong business performance it was decided by the Board to increase Pekka Lundmark's base salary by 3.5%, which is lower than Nokia's 2022 average global salary increase for the general employee population.

2022 remuneration outcomes

The 2022 short-term incentive outcome for the President and CEO at 144% of overall target reflects Nokia's strong 2022 performance. The Board is satisfied with both the financial outcome and the progress as measured against our ESG metrics, which is important to Nokia's future success and sustainability.

The 2020 Performance share plan metric is based on share price increase achieved and dividends payable. Awards to the President and CEO and other GLT members were made in the second half of 2020 and accordingly performance outcomes will be known in the second half of 2023 as a result of the 36-month performance period. The incentive range for the 2020 Performance Share plan is not disclosed until after vesting takes place in 2023, in order to safeguard commercially sensitive information.

Share ownership requirement

Pekka Lundmark significantly exceeds the shareholding requirement with a holding worth more than four times his annual base salary against a requirement of three times. This is a sign of his commitment to and alignment with Nokia's long-term success.

Short- and long-term incentives in 2023

Our 2023 incentive structure for the President and CEO and the rest of the GLT is outlined below.

Delivering sustainable value – Long-term incentive		
Two-thirds Absolute Total Shareholder Return, one-third Relative Total Shareholder Return		
Focus on increase in share price and payment of the dividend		
Delivering the next year's step in the strategic plan – Short-term incentive		
Economic profit 70%	Environmental, social and governance aspects (ESG) 20%	Strategic objective 10%
Deliver Economic profit	Deliver on our responsibilities to reduce carbon emissions and become a more diverse employer	Deliver meaningful strategic actions

The 2023 Performance shares under the Nokia Long-term Incentive Plan 2021–2023 is based on absolute TSR (as measured by dividend adjusted share price at the end of the performance period) and relative TSR performance (the absolute TSR as measured against our 27 comparator companies) over the life of the three-year plan from the date of the award. The President and CEO, and the rest of the GLT will continue to receive Performance shares as the main form of their long-term incentives. Our compensation approach and structure continues to play a key role in supporting Nokia's business strategy and sustainable share price growth over time.

In the Remuneration Report, we also show a comparison of the development of compensation for the Board members and the President and CEO, against average employee remuneration and Nokia's financial development over the last five years. The comparison continues to show a clear link between President and CEO pay and Company performance.

I will be stepping down from the Nokia Board effective in April at the 2023 Annual General Meeting. It has been an honor to serve as the Chair of the Personnel Committee during a period in which we increased our engagement with investors and moved to a compensation program that is better aligned with the investor, stakeholder and management interests, introduced incentives to drive ESG outcomes, and improved our disclosures to Investors. In my more than 10 years on the Nokia Board, I have never felt better about Nokia's future.

Bruce Brown

Chair of the Personnel Committee

Remuneration Policy

Nokia Corporation's Remuneration Policy was supported at the Annual General Meeting 2020 receiving 86% of votes in favor. This policy remained in force and unchanged during 2022. The information below is provided as a summary for ease of reference.

In addition to applying the Remuneration Policy to our President and CEO, the principles of our policy extend to the Group Leadership Team. This includes caps to equity award amounts and provisions related to clawback.

The Board regularly monitors the effectiveness of the measures used in our incentive plans to ensure that they align with and drive the strategy of the Company.

Remuneration summary for the Board of Directors

The Board's Corporate Governance and Nomination Committee periodically reviews the remuneration for the Chair and members of the Board against companies of similar size and complexity. The objective of the Corporate Governance and Nomination Committee is to enable Nokia to compete for the top-of-the-class Board competence in order to maximize the value creation for the shareholders. The Committee's aim is to ensure that the Company has an efficient Board comprised of international professionals representing a diverse and relevant mix of skills, experience, background and other personal qualities in line with the diversity principles established by the Board. Competitive Board remuneration contributes to the achievement of this target.

The structure of the Board remuneration for the current term of the Board that began at the Annual General Meeting held on 5 April 2022 and ends at the close of the Annual General Meeting in 2023 is set out in the table below.

Fees	<p>Fees consist of annual fees and meeting fees.</p> <p>Approximately 40% of the annual fee is paid in Nokia shares purchased from the market on behalf of the Board members or alternatively delivered as treasury shares held by the Company. The balance is paid in cash, most of which is typically used to cover taxes arising from the paid remuneration.</p> <p>Meeting fees are paid in cash.</p> <p>No meeting fees and no additional annual fees based on service in any of the Board Committees are paid to the Chair of the Board.</p>
Incentives	Non-executive directors are not eligible to participate in any Nokia incentive plans and do not receive performance shares, restricted shares or any other equity-based or other form of variable compensation for their duties as members of the Board.
Pensions	Non-executive directors do not participate in any Nokia pension plans.
Share ownership requirement	Members of the Board shall normally retain until the end of their directorship such number of shares that corresponds to the number of shares they have received as Board remuneration during their first three years of service in the Board (the net amount received after deducting those shares needed to offset any costs relating to the acquisition of the shares, including taxes).
Other	Directors are compensated for travel and accommodation expenses as well as other costs directly related to Board and Committee work. This compensation is paid in cash.

Remuneration for the term that began at the Annual General Meeting held on 5 April 2022 and ends at the close of the Annual General Meeting in 2023 consisted of the following fees.

Annual fee⁽¹⁾	EUR
Chair	440 000
Vice Chair	195 000
Member	170 000
Chair of Audit Committee	30 000
Member of Audit Committee	15 000
Chair of Personnel Committee	30 000
Member of Personnel Committee	15 000
Chair of Technology Committee	20 000
Member of Technology Committee	10 000
Meeting fee⁽²⁾	EUR
Meeting requiring intercontinental travel	5 000
Meeting requiring continental travel	2 000

(1) The fees payable to the Committee Chairs and members were not paid to the Chair of the Board for her service in any of the Board Committees.

(2) Paid for a maximum of seven meetings per term. Was not paid to the Chair of the Board.

Proposals of the Board of Directors to the Annual General Meeting 2023 were published on 26 January 2023. To ensure the competitiveness of the Board remuneration and reflecting the fee development in Nokia's global peer group, the Corporate Governance and Nomination Committee has resolved to recommend to the Board that the annual fees of Board members, save for the Chair of the Board, be proposed to be increased by EUR 15 000. Other remuneration payable to the Board and all Committee members would remain at an unchanged level.

Consequently, on the recommendation of the Board's Corporate Governance and Nomination Committee and in line with Nokia's Remuneration Policy, the Board of Directors proposes to the Annual General Meeting 2023 that the annual fees payable for a term ending at the close of the next Annual General Meeting be as follows: EUR 440 000 for the Chair of the Board, EUR 210 000 for the Vice Chair of the Board, EUR 185 000 for each member of the Board, EUR 30 000 each for the Chairs of the Audit Committee and the Personnel Committee and EUR 20 000 for the Chair of the Technology Committee as an additional annual fee, EUR 15 000 for each member of the Audit Committee and Personnel Committee and EUR

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10 000 for each member of the Technology Committee as an additional annual fee. Further, the additional annual fees are paid to all members of the above-mentioned Committees, including the Board Chair.

In order to align the interests of the Board members with those of the shareholders, it is also proposed that, in line with the Company's Corporate Governance Guidelines, approximately 40% of the annual fee be paid in Nokia shares either purchased from the market on behalf of the Board members or alternatively delivered as treasury shares held by the Company.

In addition, the Board of Directors proposes that the meeting fees for Board and Board Committee meetings remain at the current level and are paid to all Board members, including the Board Chair. The meeting fees are based on potential travel required between the Board member's home location and the location of a meeting and paid for a maximum of seven meetings per term as follows: EUR 5 000 per meeting requiring intercontinental travel; and EUR 2 000 per meeting requiring continental travel. Only one meeting fee is paid if the travel entitling to the fee includes several meetings of the Board and its Committees.

The Board also proposes that members of the Board of Directors shall be compensated for travel and accommodation expenses as well as other costs directly related to Board and Board Committee work. The meeting fee, travel expenses and other expenses would be paid in cash.

Remuneration summary for the President and CEO

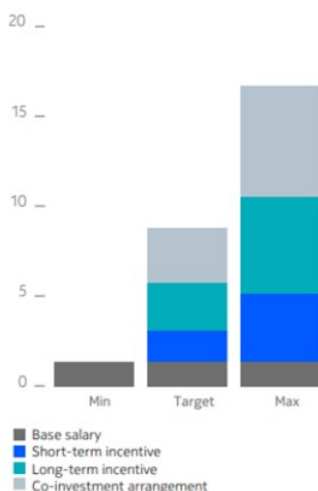
Element	Year ending 31 December 2023	Year ended 31 December 2022	Purpose	Operation	Opportunity
Name	Pekka Lundmark	Pekka Lundmark			
Base salary	EUR 1 345 500	EUR 1 300 000	Provide competitive base salary to attract and retain individual with the requisite level of knowledge, skills and experience to lead our businesses.	Base pay is normally reviewed annually taking into consideration a variety of factors, including, for example, the following: <ul style="list-style-type: none"> ■ performance of the Company and the individual; ■ remuneration of our external comparator group; ■ changes in individual responsibilities; and ■ employee salary increases across Nokia and in the local market. 	Pay reviews are set within the context of employee increases and changes within the Nokia peer group. Changes reflect not only improving performance but also improving competence and skills as would be applied to any other employee in Nokia.
Short-term incentives	Measures: 100% Nokia scorecard - 70% Economic profit - 20% Environment, social and governance - 10% Strategic objectives	Measures: 100% Nokia scorecard - 70% Comparable operating profit - 20% Strategic objectives - 10% Environment, social and governance	To incentivize and reward performance against delivery of the annual business plan.	Short-term incentives are based on performance against single-year targets and normally paid in cash. Targets for the short-term incentives are set at the start of the year, in the context of analyst expectations and the annual plan, selecting measures that align to the delivery of Nokia's strategy. Achievement is assessed at the end of the year. Short-term incentives are subject to the clawback policy (see below).	Target award 125% of base salary Minimum 0% of base salary Maximum 281.25% of base salary
Long-term incentives (Performance Shares)	Target award 200% of base salary (EUR 2 691 000) Minimum 0% of base salary Maximum 400% of base salary ⁽¹⁾ Metrics: 2/3 ^{ds} Absolute Total Shareholder return 1/3 rd Relative Total Shareholder Return	Target award 200% of base salary (EUR 2 600 000) Minimum 0% of base salary Maximum 400% of base salary ⁽¹⁾ Metric: Absolute Total Shareholder Return	To reward for delivery of sustainable long-term performance, align the President and CEO's interests with those of shareholders and aid retention.	Long-term incentive awards are normally made in performance shares and paid for performance against longer-term targets. Targets are set in the context of the Nokia long-term plans and analyst forecasts ensuring that they are considered both demanding and motivational. Long-term incentives are subject to the clawback policy (see below).	Target award 200% of base salary Minimum 0% of base salary Maximum 400% of base salary ⁽¹⁾ The Board's Personnel Committee retains discretion to make awards up to twice that level in exceptional circumstances such as for example upon recruitment, significant change in responsibilities, significant strategic change or other similar events. The use of discretion would be explained at the time.
Pension	Contribution to the mandatory TyEL pension plan in Finland.	Contribution to the mandatory TyEL pension plan in Finland.	To provide for retirement with a level of certainty.	Retirement age is defined and pensions are provided in line with local country arrangements; in Finland this is the statutory Finnish pension system (Finnish TyEL). Under the TyEL arrangements, base salary, incentives and other taxable benefits are included in the definition of earnings while gains from equity-related plans are not. No supplemental pension arrangements are provided in Finland.	Pursuant to Finnish legislation, Nokia is required to make contributions to the Finnish TyEL pension arrangements in respect of the President and CEO. Such payments can be characterized as defined contribution payments. The amount is disclosed in the Remuneration Report.
Benefits & mobility	Life and critical illness insurance, private medical insurance and company car, phone etc.	Life and critical illness insurance, private medical insurance and company car, phone etc.	To attract, retain and protect the President and CEO.	Benefits are made available as part of the same policy that applies to employees more broadly in the relevant country. Additionally other benefits, such as security provisions, may be provided as appropriate.	The value will be the cost to the company.
Total Target Remuneration	EUR 5 718 375 ⁽¹⁾	EUR 5 525 000 ⁽¹⁾			
Share ownership requirement	Requirement: 3 times annual base salary Requirement (value): EUR 4 036 500	Requirement: 3 times annual base salary Requirement (value): EUR 3 900 000			

(1) Excluding share price growth and the matching shares under the 2020 and 2021 eLTI co-investment arrangements.

Illustration of the earning opportunity for the President and CEO

The illustration below shows the pay components of the President and CEO at minimum, target and maximum payout. It includes an annual apportionment of both 2020 and 2021 eLTI co-investment arrangements. Pekka Lundmark chose to invest in both years aligning a considerable proportion of his incentive directly to shareholder return.

Earning opportunity of the President and CEO (EURm)



Share ownership requirement

Nokia believes that it is desirable for its executives to own shares in Nokia to align their interests with those of shareholders and to ensure that their decisions are in the long-term interest of the company. The President and CEO is required to own three times his or her annual base salary in Nokia shares and is given a period of five years from appointment to achieve the required level of share ownership.

Remuneration on recruitment

Our policy on recruitment is to offer a compensation package that is sufficient to attract, retain and motivate the individual with the right skills for the required role.

On occasion, we may offer compensation to buy out awards or other lost compensation which the candidate held prior to joining Nokia, but which lapsed upon the candidate leaving their previous employer. Due consideration is given to the potential value and timing of such awards, taking into account any conditions attached to the awards and the likely performance against such conditions.

Clawback

The President and CEO is subject to a clawback policy where any restatement of financial results may result in the reclaiming of amounts previously paid, which had been based on numbers that have since been materially restated. Any such reclaimed amount, and the period over which payments can be reclaimed, will take into account the circumstances and duration of any misstatement. In the case of unintentional misstatement, payments made within the last three years may be subject to the policy at the discretion of the Personnel Committee.

Termination provisions

In the event of a termination of employment, any payable compensation is determined in line with legal advice regarding local legislation, country policies, contractual obligations and the rules of the applicable incentive and benefit plans. Current termination provisions of the President and CEO's service agreement are described in the Remuneration Report.

Change of control arrangements, if any, are based on a double trigger structure, which means that both a specified change of control event and termination of the individual's employment must take place for any change of control-based severance payment to materialize.

Remuneration Report 2022

Please note that the Remuneration Report, applicable to the Board and President and CEO, subject to an advisory vote at the Annual General Meeting 2023, is set out below and is also published on a stock exchange release. Other compensation-related information provided before and after the Remuneration Report is not subject to a vote at the Annual General Meeting 2023, but provides further information on the compensation policies applied within Nokia and the compensation of the Group Leadership Team.

Introduction

This Remuneration Report (the Report) of Nokia Corporation (Nokia or Company) has been approved by the Company's Board of Directors to be presented to the Annual General Meeting 2023. The resolution of the Annual General Meeting on the Report is advisory. The Report presents the remuneration of the members of the Board of Directors and the President and CEO for the financial year 2022 in accordance with the Finnish Decree of the Ministry of Finance 608/2019, the Finnish Corporate Governance Code of 2020 as well as other applicable Finnish laws and regulations.

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The members of the Board of Directors and the President and CEO have been remunerated in accordance with our approved Remuneration Policy during the financial year 2022. No temporary or other deviations from the Policy have been made and no clawback provisions have been exercised during the financial year 2022.

In 2022, our remuneration structure promoted the Company's long-term financial success by setting the performance criteria for short- and long-term incentives to support the Company's short- and long-term goals, as well as through shareholding requirements set for the President and CEO and the Board members. Aligned with Nokia's pay-for-performance remuneration principle, performance-based compensation was emphasized over fixed base salary. The setting and application of the performance criteria for incentive programs executed the philosophy of pay-for-performance and supported the delivery of the corporate strategy as well as the creation of long-term sustainable shareholder value.

The table below compares the development of the remuneration of our Board of Directors, President and CEO, average employee pay and the Company performance.

Year	Aggregate remuneration of the Board of Directors (EUR) ⁽¹⁾	President and CEO actual remuneration (EUR)	Average Salaries and Wages (EUR) ⁽³⁾	Net sales (EURm)	Total Shareholder Return (Rebased to 100 at 31 Dec 2017) ⁽⁴⁾
2018	2 203 000	4 651 009	63 220	22 563	85.92
2019	2 219 000	3 897 625	61 980	23 315	57.48
2020	2 016 000	3 587 781 ⁽²⁾	65 787	21 852	54.95
2021	1 821 000	4 908 244	70 411	22 202	132.63
2022	2 280 000	4 316 606	74 100	24 911	119.31

(1) Aggregate total remuneration paid to the members of the Board during the financial year as annual fee and meeting fee, as applicable, and as approved by general meetings of shareholders. The value depends on the number of members elected to the Board for each term as well as on the composition of the Board committees and travel required.

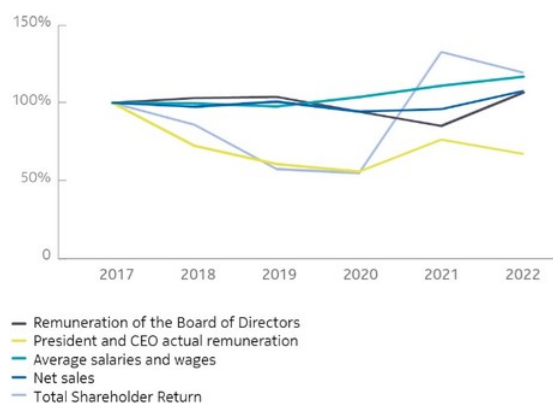
(2) The President and CEO actual remuneration represents the combined total in 2020, when Pekka Lundmark replaced Rajeev Suri.

(3) Average salaries and wages are based on average employee numbers and their total salaries and wages as reported in the Company's financial statements.

(4) Total shareholder return on last trading day of the previous year.

We also present this data graphically:

Comparative data (rebased year end 2017 = 100)



While the graph reflects the euro values paid during each financial year, in practice the Board members' remuneration closely aligns with the performance of the Company and the total shareholder return. Approximately 40% of the Board members' annual fees are paid in Nokia shares purchased from the market on their behalf. The rest of the annual fee was paid in cash, most of which is typically used to cover taxes arising from the remuneration. All members of the Board were non-executive during the financial years 2018–2022.

The pay-for-performance remuneration principle applied to the President and CEO as well as the shareholding requirement of the President and CEO and the Board members, as applicable, contribute to an alignment of interests with shareholders, while also promoting and incentivizing decisions that are in the long-term interest of the Company.

Remuneration of the Board of Directors

The shareholders resolve annually on director remuneration at the Annual General Meeting based on a proposal made by the Board of Directors on the recommendation of the Board's Corporate Governance and Nomination Committee.

At the Annual General Meeting held on 5 April 2022 Kari Stadigh stepped down from the Board and the Annual General Meeting resolved to elect 10 members to the Board. The following Board members were re-elected for a term ending at the close of the Annual General Meeting 2023: Sari Baldauf, Bruce Brown, Thomas Dannenfeldt, Jeanette Horan, Edward Kozel, Søren Skou and Carla Smits-Nusteling. Lisa Hook, Thomas Saueressig and Kai Östämö were elected as new members of the Board for the same term.

The aggregate amount of compensation paid to Board members in 2022 equaled EUR 2 280 000 of which EUR 2 205 000 consisted of annual fees and the rest of meeting fees. In accordance with the resolution by the Annual General Meeting 2022, approximately 40% of the annual fee from Board and Board Committee work was paid in Nokia shares purchased from the market on behalf of the Board members following the Annual General Meeting. The directors shall retain until the end of their directorship such number of shares that corresponds to the number of shares they have received as Board remuneration during their first three years of service on the Board. The rest of the annual fee was paid in cash. All meeting fees were also paid in cash.

It is the Company's policy that the non-executive members of the Board do not participate in any of Nokia's equity programs and do not receive performance shares, restricted shares, or any other equity-based or other variable compensation for their duties as Board members. No such variable compensation was paid since all persons acting as Board members during the financial year 2022 were non-executive.

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The following table outlines the total annual compensation paid in 2022 to the members of the Board for their services, as resolved by the shareholders at the Annual General Meeting.

	Annual fee (EUR)	Meeting fees (EUR) ⁽¹⁾	Total remuneration paid (EUR)	60% of annual fees and all meeting fees paid in cash (EUR)	40% of annual fees paid in shares (EUR)	Number of Shares approximately 40% of the annual fee
Sari Baldauf (Chair)	440 000	–	440 000	264 000	176 000	36 217
Søren Skou (Vice Chair)	210 000	9 000	219 000	135 000	84 000	17 285
Bruce Brown	210 000	17 000	227 000	143 000	84 000	17 285
Thomas Dannenfeldt	200 000	9 000	209 000	129 000	80 000	16 462
Lisa Hook	185 000	7 000	192 000	118 000	74 000	15 227
Jeanette Horan	195 000	–	195 000	117 000	78 000	16 050
Edward Kozel	205 000	12 000	217 000	135 000	82 000	16 874
Thomas Saueressig	180 000	7 000	187 000	115 000	72 000	14 816
Carla Smits-Nusteling	200 000	9 000	209 000	129 000	80 000	16 462
Kari Stadigh (until 5 April 2022) ⁽²⁾	–	–	–	–	–	–
Kai Oistämö	180 000	5 000	185 000	113 000	72 000	14 816
Total	2 205 000	75 000	2 280 000	1 398 000	882 000	181 494

(1) Meeting fees include all meeting fees paid for the term that ended at the Annual General Meeting held on 5 April 2022 and meeting fees accrued and paid in 2022 for the term that began at the same meeting.

(2) Stepped down at the Annual General Meeting on 5 April 2022 and did not receive any annual or meeting fees in 2022.

Remuneration of the President and CEO

The following table shows the actual remuneration received by Pekka Lundmark in 2022 and 2021. The long-term incentive figures relate to the release of restricted shares granted on joining in respect of forfeited shares from his previous employer.

EUR	2022	Pay mix ⁽¹⁾	2021	Pay mix ⁽¹⁾
Salary	1 300 000	31%	1 300 000	27%
Short-term incentive ⁽²⁾	2 342 438	56%	2 975 781	61%
Long-term incentive	560 318	13%	596 732	12%
Other compensation ⁽³⁾	113 850		35 731	
Total	4 316 606		4 908 244	

(1) Pay mix reflects the proportions of base salary, short-term incentive and long-term incentive of total compensation, excluding other compensation.

(2) Short-term incentives represent amounts earned in respect of the financial year, but that are paid in April of the following year.

(3) Other compensation includes benefits such as telephone, car, driver, tax compliance support, and medical insurance.

Pursuant to Finnish legislation, Nokia is required to make contributions to the Finnish TyEL pension arrangements in respect of the President and CEO. Such payments can be characterized as defined contribution payments. In 2022, payments to the Finnish state pension system equaled EUR 475 384 for Pekka Lundmark in respect of his service as President and CEO (EUR 314 457 for Pekka Lundmark in 2021). No supplementary pension arrangements were offered.

Short-term incentive

The 2022 short-term incentive framework for the President and CEO was based on financial, strategic and ESG objectives. Achievement against the 2022 targets was as follows:

Metric	Weight	Target	Achievement
Comparable Operating Profit ⁽¹⁾	70%	2 885 EURm	156%
Diversity	5%	Diversity of new hires	60%
Emissions Scopes 1,2 and 3	5%	293 955 tCO ₂ e (Scopes 1 and 2)	151%
Strategic Objectives ⁽²⁾	20%	Balanced scorecard (Scope 3)	122%
		Individual objectives	122%

(1) Non-IFRS measure. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

(2) The outcome is driven by growth in Enterprise sales and projects that are important to Nokia's future.

Accordingly, the short-term incentive of Pekka Lundmark as the President and CEO equaled EUR 2 342 438 or 144% of the target award.

Long-term incentives

In 2022, Pekka Lundmark was awarded the following Performance share awards under Nokia's Long-term Incentive Plan 2021–2023. The performance condition for the 2022 Performance shares is based on absolute total shareholder return and the actual achievement will be detailed following the end of the three-year performance period.

Performance share awards ⁽¹⁾	Units awarded	Grant date fair value (EUR)	Grant date	Vesting
Awarded as regular performance share award	543 900	2 409 477	6 July 2022	Q3 2025

(1) The 2022 Performance shares have a three-year performance period based on absolute total shareholder return. The maximum payout is 200% subject to maximum performance against the performance criterion. Vesting is subject to continued employment.

Vesting for the President and CEO during the year

The second tranche of Pekka Lundmark's 2020 restricted share award, made to him on joining in recognition of forfeited awards from his previous employer, vested on 1 October 2022, releasing 117 467 shares to the value of EUR 560 318.

Share awards vesting during the year	Units awarded	Target	Achievement	Units vesting
2020 Restricted Share Award Tranche 2	117 467	N/A	N/A	117 467

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Share ownership and unvested share awards

Our share ownership policy requires that the President and CEO holds a minimum of three times his or her annual base salary in Nokia shares in order to ensure alignment with shareholder interests over the long term. Pekka Lundmark significantly exceeds this requirement with a holding of more than four times base salary, well within the five-year allotted period.

Pekka Lundmark's unvested shares include his 2020 and 2021 eLTI awards, the last tranche of his buy-out Restricted share award as well as any Performance share grants made to him since joining Nokia. The payout of his 2020 eLTI and Performance shares will not be known until later in 2023.

The eLTI is a selective arrangement offered to senior leaders in 2021 and to the president and CEO in 2020. In return for the purchase and continued holding of Nokia shares, a 2:1 match of Nokia Performance shares was made which vest after three years subject to absolute total shareholder return and continued employment. The maximum payout is 200% subject to maximum performance against the performance criterion.

Pekka Lundmark	Units	Value⁽¹⁾ (EUR)
Beneficially owned shares at 31 December 2022	1 289 304	5 578 818
Unvested shares under outstanding Nokia equity plans ⁽²⁾	4 455 440	19 278 689
Total	5 744 744	24 857 507

(1) The values are based on the closing price of a Nokia share of EUR 4.327 on Nasdaq Helsinki on 30 December 2022.

(2) The number of units represents the number of unvested awards as of 31 December 2022.

President and CEO's termination provisions are as follows:

Termination by	Reason	Notice	Compensation
Nokia	Cause	None	The President and CEO is entitled to no additional compensation and all unvested equity awards would be forfeited after termination.
Nokia	Reasons other than cause	Up to 12 months	The President and CEO is entitled to a severance payment equaling up to 12 months of compensation (including annual base salary, benefits, and target incentive) and unvested equity awards would be forfeited after termination.
President and CEO	Any reason	12 months	The President and CEO may terminate his service agreement at any time with 12 months' prior notice. The President and CEO would either continue to receive salary and benefits during the notice period or, at Nokia's discretion, a lump sum of equivalent value. Additionally, the President and CEO would be entitled to any short- or long-term incentives that would normally vest during the notice period. Any unvested equity awards would be forfeited after termination.
President and CEO	Nokia's material breach of the service agreement	Up to 12 months	In the event that the President and CEO terminates his service agreement based on a final arbitration award demonstrating Nokia's material breach of the service agreement, he is entitled to a severance payment equaling up to 12 months of compensation (including annual base salary, benefits and target incentive). Any unvested equity awards would be forfeited after termination.

The President and CEO is subject to a 12-month non-competition and non-solicit obligation that applies after the termination of the service agreement or the date when he is released from his obligations and responsibilities, whichever occurs earlier.

Remuneration governance

We manage our remuneration through clearly defined processes, with well-defined governance principles, ensuring that no individual is involved in the decision-making related to their own remuneration and that there is appropriate oversight of any compensation decision. Remuneration of the Board is annually presented to shareholders for approval at the Annual General Meeting and the remuneration of the President and CEO is approved by the Board.

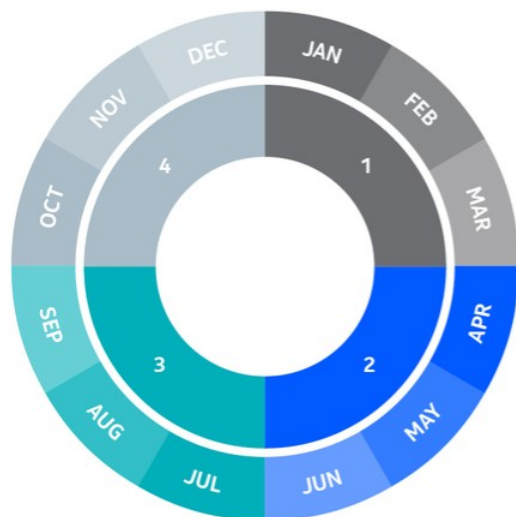
The Board submits its proposal to the Annual General Meeting on the recommendation of the Board's Corporate Governance and Nomination Committee, which actively considers and evaluates the appropriate level and structure of directors' remuneration. Shareholders also authorize the Board to resolve to issue shares, for example to settle Nokia's equity-based incentive plans, based on the proposal of the Board.

The Board of Directors approves, and the independent members of the Board confirm, the compensation of the President and CEO, upon recommendation of the Personnel Committee. The Personnel Committee consults regularly with the President and CEO and the Chief People Officer though they are not present when their own compensation is reviewed or discussed. This enables the Personnel Committee to be mindful of employee pay and conditions across the broader employee population. The Committee has the power, in its sole discretion, to retain compensation consultants to assist the Personnel Committee in evaluating executive compensation.

The Personnel Committee Chair regularly engages with shareholders to discuss their views on our compensation policies, programs and associated disclosures and reflect on their feedback. These insights have informed an expansion of the ESG weighting in the short-term incentive and the introduction of relative TSR as a metric in the 2023 Performance shares.

Work of the Personnel Committee

The Personnel Committee convened five times during 2022 with a general theme for each meeting.



- 1 Approvals & reporting
- 2 Philosophy & structure
- 3 Long-term direction & market review
- 4 Planning

February

- Incentive targets and objectives
- Nokia Equity Program
- Culture evolution
- Prior year's incentive results
- President and CEO remuneration

May

- Culture update
- Shareholder feedback in the AGM
- GLT compensation review
- Policy and structure review

July

- People risks and opportunities
- LTI Development
- Status of incentive payouts and ESG goal achievement

The President and CEO

The President and CEO has an active role in the compensation governance and performance management processes for the Group Leadership Team and the wider employee population at Nokia.

The President and CEO is not a member of the Personnel Committee and does not vote at Personnel Committee meetings, nor does he participate in any conversations regarding his own compensation.

Advisors

The Personnel Committee engaged Willis Towers Watson, an independent external consultant, to assist in the review and determination of executive compensation and program design and provide insight into market trends and regulatory developments.

September

- Succession
- 2023 Incentive framework
- Analytics and demographics
- Equity plan direction

December

- Personnel Committee charter review
- 2023 Incentive metrics
- Shareholder feedback ahead of 2023 proxy season
- Remuneration Report for 2022

Group Leadership Team

At the end of 2022, the Group Leadership Team consisted of 10 persons split between Finland, other European countries, Singapore and the United States. For information regarding the current Group Leadership Team composition, refer to the Corporate Governance Statement.

Name	Position in 2022	Appointment date
Pekka Lundmark	President and CEO	1 August 2020
Nishant Batra	Chief Strategy and Technology Officer	18 January 2021
Ricky Corker	Chief Customer Experience Officer	1 January 2019
Federico Guillén	President of Network Infrastructure	8 January 2016
Amy Hanlon-Rodemich	Chief People Officer	24 October 2022
Jenni Lukander	President of Nokia Technologies	1 August 2019
Raghav Sahgal	President of Cloud and Network Services	1 June 2020
Melissa Schoeb	Chief Corporate Affairs Officer	12 April 2021
Tommi Uitto	President of Mobile Networks	31 January 2019
Marco Wirén	Chief Financial Officer	1 September 2020

The remuneration of the members of the Group Leadership Team consists of base salary, other benefits, and short- and long-term incentives. Short-term incentive plans are based on rewarding the delivery of business performance utilizing certain, or all, of the following metrics as appropriate to the member's role: comparable operating profit of Nokia, segment operating profit for the relevant business group, diversity and carbon emission targets and defined strategic objectives.

Executives on the Group Leadership Team are subject to the same remuneration policy framework as the President and CEO. This includes being subject to clawback and shareholding requirements. The shareholding requirement for members of the Group Leadership Team is two times their base salary.

Remuneration of the Group Leadership Team in 2022

Remuneration of the Group Leadership Team (excluding the President and CEO) in 2021 and 2022, in the aggregate, was as follows:

	2022 EURm ⁽¹⁾	2021 EURm ⁽¹⁾
Salary, Short-term incentives and other compensation ⁽²⁾	13.6	16.0
Long-term incentives ⁽³⁾	7.0	2.2
Total	20.6	18.2

(1) The values represent each member's time on the Group Leadership Team.

(2) Short-term incentives represent amounts earned in respect of 2022 performance. Other compensation includes mobility related payments, local benefits and pension costs.

(3) The amounts represent the equity awards that vested in 2022 and 2021.

The members of the Group Leadership Team (excluding the President and CEO) were awarded the following equity awards under the Nokia equity program in 2022:

Award	Units awarded ⁽¹⁾	Grant date fair value (EUR)	Grant date	Vesting
Performance share award ⁽²⁾	1 610 900	7 148 486	6 July and 15 December 2022	Q3 and Q4 2025
Restricted share award ⁽³⁾	58 900	260 927	6 July 2022	Q3 2023

(1) Includes units awarded to persons who were Group Leadership Team members during 2022.

(2) The 2022 Performance shares have a three-year performance period based on absolute total shareholder return. The maximum payout is 200% subject to maximum performance against the performance criterion. Vesting is subject to continued employment.

(3) Vesting of each tranche of the restricted share awards is conditional on continued employment.

Unvested equity awards held by the Nokia Group Leadership Team, including the President and CEO

The following table sets forth the potential aggregate ownership interest through the holding of equity-based long-term incentives of the Group Leadership Team in office, including the President and CEO, as of 31 December 2022:

	Shares receivable through performance shares at grant	Shares receivable through performance shares at maximum ⁽⁴⁾	Shares receivable through restricted shares
Number of equity awards held by the Group Leadership Team ⁽¹⁾	10 191 488	20 382 976	357 090
% of the outstanding shares ⁽²⁾	0.18%	0.36%	0.01%
% of the total outstanding equity incentives (per instrument) ⁽³⁾	16.05%	16.05%	0.66%

(1) Includes the 10 members of the Group Leadership Team in office at 31 December 2022.

(2) The percentages are calculated in relation to the outstanding number of shares and total voting rights of Nokia at 31 December 2022, excluding shares held by the Nokia Group. No member of the Group Leadership Team owns more than 1% of the outstanding Nokia shares.

(3) The percentages are calculated in relation to the total outstanding equity incentives per instrument.

(4) At maximum performance, under the performance share plans outstanding at 31 December 2022, the payout would be 200% and the table reflects this potential maximum payout.

Review of our incentive plans

Each year we monitor the performance of our incentive plans against the targets for the plan, total shareholder return and the impact that the plans have on total compensation compared with market peers.

Target setting

Targets for the short-term incentives are set annually at or before the start of the year, balancing the need to deliver value with the need to motivate and drive performance of the Group Leadership Team. Targets are selected from a set of strategic metrics that align with driving sustainable value for shareholders and are set in the context of market expectations and analyst consensus forecasts. Targets for our long-term incentive plans are set in a similar context. The long-term incentive targets are set at the start of the performance period and locked in for the life of the plan.

Short-term incentives

In 2022, short-term incentive targets and achievements were based on a mix of metrics as shown below. Targets were measured either at a Nokia Group level or, alternatively, at a mix of Nokia Group and business group level for business group presidents.

- Comparable operating profit of Nokia*
- Segment operating profit for the relevant business group
- Role related strategic objectives
- ESG (carbon emissions and diversity)

Those Group Leadership Team members not leading a business group will have the equivalent proportion of their incentive based on Nokia's comparable operating profit.

* Non-IFRS measure. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

Long-term incentives

We annually review compensation against key metrics such as total shareholder return and share price to validate the effectiveness of our equity plans.

The 2020 Performance share plan is due to vest in the second half of 2023 and accordingly the performance outcome for the three-year period will then be known.

The metric for the performance shares awarded in 2022 (under the Nokia LTI Plan 2021–2023) was based on total shareholder return in a similar manner to the 2020 and 2021 awards. This reflects our commitment to driving the best direct, long-term results and closely aligns plan participants with the interests of shareholders. Awards to senior executives and leaders were made in July. Awards are not due to vest until a corresponding date three years later in 2025. The performance conditions remained constant for all performance share awards made in 2022.

Nokia Long-Term Incentive Plan and Employee Share Purchase Plan 2021–2023

The Long-term Incentive Plan (LTI Plan) intends to effectively contribute to the long-term value creation and sustainability of the Company and align the interests of the executives and employees with those of Nokia's shareholders. Nokia's Long-term Incentive Plan for 2021–2023 is a key tool which supports these objectives. Under the LTI Plan the Company may grant eligible executives and other employees awards in the form of both Performance shares and Restricted shares.

Awards under the LTI Plan may be granted between the date the plan is approved and 31 December 2023 subject to applicable performance metrics as well as performance and/or restriction periods of up to 36 months depending on the award. Consequently, the restriction periods for the last awards granted under the LTI Plan would end in 2026. Performance metrics as well as weightings and targets for the selected metrics for Performance shares are set by the Board of Directors annually to ensure they continue to support Nokia's long-term business strategy and financial success.

The potential maximum aggregate number of Nokia shares that may be issued based on awards granted under the LTI Plan in 2021, 2022 and 2023 is 350 million. Until the Nokia shares are delivered, the participants will not have any shareholder rights, such as voting or dividend rights associated with the Performance or Restricted shares. If the participant's employment with Nokia terminates before the vesting date of the award or a part of an award, the individual is not, as a main rule, entitled to settlement based on the plan.

The approach for 2023 will be that the majority of the LTI Plan participants receive Restricted shares rather than Performance shares. Executives continue to receive Performance shares as the main form of long-term incentives. The 2023 metrics for Performance shares will change to a blend of two-thirds absolute total shareholder return (absolute TSR) and one-third relative total shareholder return (relative TSR) against our comparator group for the President and CEO, GLT and some senior executives. Other executives will receive a mixture of Performance Shares and Restricted Shares. The Performance shares awarded to other executives (excluding President and CEO, GLT and some senior executives) will be subject to absolute TSR metrics only. All Performance shares vests no earlier than three years from grant. In general, Restricted shares will vest three years from grant (cliff vesting) which will be applicable to executives receiving part of their main long-term incentive in Restricted Shares. In limited cases, predominantly related to extraordinary retention and recruitment and in the U.S., the Company may introduce different vesting periods with tranche vesting.

The purpose of the employee share purchase plan (ESPP) is to encourage share ownership within the Nokia employee population, increasing engagement and sense of ownership in the company. Under the ESPP 2021–2023, subject to the Board commencing annual plan cycles, the eligible employees may elect to make contributions from their monthly net salary to purchase Nokia shares at market value on pre-determined dates on a quarterly basis during the applicable plan period. Nokia would deliver one matching share for every two purchased shares that the participant still holds at the end of applicable plan cycle. In addition, the participants may be offered free shares subject to meeting certain conditions related to participation as determined by the Board.

The maximum number of shares that can be issued under all plan cycles commencing under the ESPP in 2021, 2022 and 2023 is 35 million. Participants have immediate shareholder rights over all shares purchased from the market. Until the matching or free Nokia shares are delivered, the participants will not have any shareholder rights, such as voting or dividend rights associated with the matching or free shares.

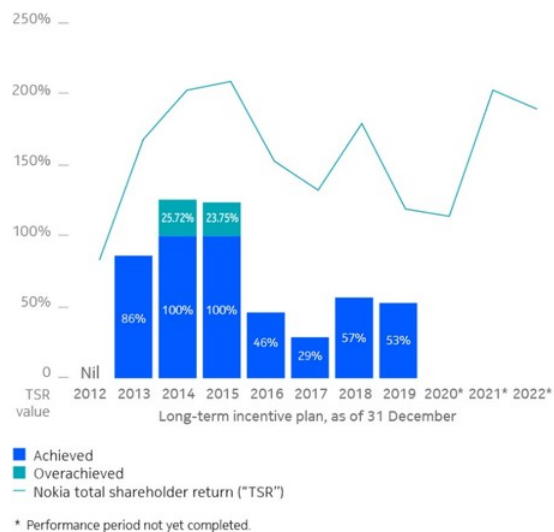
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Pay for performance

Core to our compensation philosophy is a desire to pay for performance.

Each year we review overall total shareholder return compared with long-term incentive payouts mapping the performance of the plans against the total shareholder return curve.

Share price and total shareholder return vs long-term incentive performance



Looking at the performance of our long-term incentive plans against total shareholder return, there is a reasonable alignment with the performance of the plans declining as total shareholder return declines.

The Board continues to actively monitor the performance of our long-term incentive plans to ensure that they deliver value for shareholders.

Comparator companies

This consists of the following 27 companies.

ABB	Ciena	IBM	Philips
Adobe	Cisco Systems	Infineon Technologies	SAP
Airbus	Corning	Juniper Networks	Siemens Healthineers
ASML	Dell Technologies	Kone	VMware
Atos	Ericsson	Motorola Solutions	Vodafone Group
BAE Systems	Hewlett Packard Enterprise	NXP Semiconductors	Wärtsilä
Capgemini	HP	Oracle	

Operating and financial review and prospects

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Selected financial data

This section includes selected financial and other measures for the Nokia Group as of and for each of the years in the three-year period ended 31 December 2022. The information has been derived from, and should be read in conjunction with, our audited consolidated financial statements prepared in accordance with IFRS. The consolidated financial statements as of 31 December 2022 and 2021 and for the years ended 31 December 2022, 2021 and 2020 are included in this report.

	2022	2021	2020
For the year ended 31 December			
(in EURm, except for percentage and personnel data)			
From the consolidated income statement			
Net sales	24 911	22 202	21 852
Operating profit	2 318	2 158	885
% of net sales	9.3%	9.7%	4.0%
Profit before tax	2 184	1 926	743
Profit/(loss) for the year from continuing operations	4 210	1 654	(2 513)
Profit/(loss) for the year from discontinued operations	49	(9)	(3)
Profit/(loss) for the year	4 259	1 645	(2 516)
From the consolidated statement of financial position			
Non-current assets	22 677	20 452	17 976
Current assets	20 266	19 597	18 215
Total assets	42 943	40 049	36 191
Capital and reserves attributable to equity holders of the parent	21 333	17 360	12 465
Non-controlling interests	93	102	80
Total equity	21 426	17 462	12 545
Interest-bearing liabilities ⁽¹⁾	4 477	4 653	5 576
Lease liabilities ⁽¹⁾	1 042	1 009	910
Provisions ⁽¹⁾	1 435	1 569	1 532
Other liabilities ⁽¹⁾	14 563	15 356	15 628
Total shareholders' equity and liabilities	42 943	40 049	36 191
Other information			
Research and development expenses	(4 550)	(4 214)	(4 087)
% of net sales	(18.3)%	(19.0)%	(18.7)%
Capital expenditure ⁽²⁾	(601)	(560)	(479)
% of net sales	(2.4)%	(2.5)%	(2.2)%
Personnel expenses	(7 903)	(7 541)	(7 310)
Average number of employees	86 896	87 927	92 039
Order backlog, EUR billion	19.5	20.3	16.6
Key financial indicators and ratios			
Earnings per share attributable to equity holders of the parent			
Basic earnings per share, EUR			
Continuing operations	0.75	0.29	(0.45)
Profit/(loss) for the year	0.76	0.29	(0.45)
Diluted earnings per share, EUR			
Continuing operations	0.74	0.29	(0.45)
Profit/(loss) for the year	0.75	0.29	(0.45)
Proposed dividend per share, EUR ⁽³⁾	0.12	0.08	–
Return on capital employed % ⁽²⁾	9.5%	10.1%	4.6%
Return on shareholders' equity % ⁽²⁾	22.0%	10.9%	neg.
Equity ratio % ⁽²⁾	49.9%	43.6%	34.7%
Net debt to equity (gearing) % ⁽²⁾	(22.2)%	(26.4)%	(19.8)%
Cash and cash equivalents	5 467	6 691	6 940
Total cash and interest-bearing financial investments ⁽²⁾	9 244	9 268	8 061
Net cash and interest-bearing financial investments ⁽²⁾	4 767	4 615	2 485
Net cash flows from operating activities	1 474	2 625	1 759
Free cash flow ⁽²⁾	840	2 368	1 356

(1) Includes both current and non-current liabilities in the consolidated statement of financial position.

(2) Non-IFRS measures. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

(3) The Board of Directors proposes to the Annual General Meeting to be authorized to decide in its discretion on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity.

Operating and financial review

The financial information included in this “Operating and financial review” section as of and for the years ended 31 December 2022 and 2021 has been derived from our audited consolidated financial statements included in this report. The financial information should be read in conjunction with, and is qualified in its entirety by reference to, our audited consolidated financial statements. For a discussion of the year ended 31 December 2021 compared to the year ended 31 December 2020, please refer to the “Operating and financial review” section of our Annual Report on Form 20-F for the year ended 31 December 2021.

Results of operations

This “Results of operations” section discusses the results of our continuing operations.

Impact of COVID-19 on our operations

The COVID-19 pandemic that started in early 2020 and had a severe impact on the global economy and financial markets during the year, continued to affect people and businesses around the world in 2021 and 2022. While the situation is improving and economic recovery is on its way, certain parts of the world and certain sectors of the economy continue to be hit harder than others. While in 2020 our financial performance was impacted by temporary factory closures, temporarily lower travel and other items, in 2021 and 2022 we saw some benefit related to an increase in demand in areas like Fixed Networks, where trends such as remote working drove communications service providers to increase investments in their broadband infrastructure. In 2022, certain countries, such as China, continued to see the impact of COVID-19, causing subsequent lockdowns in many cities which had an impact on our industry’s supply chain.

As of 31 December 2022, potential risks and uncertainties continue to exist related to the scope and duration of the COVID-19 pandemic and the pace and shape of the economic recovery following it, and it is impossible to predict with accuracy the precise impact of such risks on our operations and our business.

Cost savings program

In the first quarter of 2021, we announced plans to reset our cost base, targeting a reduction of approximately EUR 600 million by the end of 2023. Given the strength in our end markets, the pace of restructuring in 2021 and 2022 has been slower than we initially planned. The overall size of the plan, however, remains unchanged, and continues to depend on the evolution of our end markets – consistent with our commentary when we announced the plan. In 2022, we updated our expectations for restructuring and associated charges as well as cash outflows, compared to our original estimates. We expect the cost savings to result in approximately EUR 500-600 million of restructuring and associated charges by 2023, down from our previous estimate of EUR 600-700 million. We also expect total restructuring and associated cash outflows to be approximately EUR 1 050-1 150 million, down slightly from our previous estimate of EUR 1 100-1 200 million. This total includes approximately EUR 500 million of cash outflows related to our previous restructuring program.

Exit of Russian market

Following the Russian invasion of Ukraine in early 2022, on 12 April 2022, Nokia announced its intention to exit the Russian market. Consequently, Nokia has suspended deliveries, stopped new business and moved its limited R&D activities out of Russia. However, Western governments had, for humanitarian reasons, expressed concerns about the risk of critical telecommunication network infrastructure in Russia failing and emphasized the importance of ensuring the continued flow of information and access to the internet which provides outside perspectives to the Russian people. Therefore, Nokia will aim to provide the necessary support to maintain the networks already present as the company exits the market and has applied for the relevant licenses to enable this support in compliance with current sanctions. Nokia sees this as the most responsible course of action to take. Regarding the financial impact of the decision, Russia accounted for less than 2% of our net sales in 2021. Additionally, Nokia recognized a provision of EUR 104 million in the first of quarter of 2022 in relation to Russia. The exiting of the market has not had a material impact on our financials in 2022.

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the results of Nokia’s continuing operations and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales	24 911	100.0	22 202	100.0	12
Cost of sales	(14 689)	(59.0)	(13 368)	(60.2)	10
Gross profit	10 222	41.0	8 834	39.8	16
Research and development expenses	(4 550)	(18.3)	(4 214)	(19.0)	8
Selling, general and administrative expenses	(3 013)	(12.1)	(2 792)	(12.6)	8
Other operating income and expenses	(341)	(1.4)	330	1.5	–
Operating profit	2 318	9.3	2 158	9.7	7
Share of results of associated companies and joint ventures	(26)	(0.1)	9	–	–
Financial income and expenses	(108)	(0.4)	(241)	(1.1)	(55)
Profit before tax	2 184	8.8	1 926	8.7	13
Income tax benefit/(expense)	2 026	8.1	(272)	(1.2)	–
Profit for the year from continuing operations	4 210	16.9	1 654	7.4	155
Attributable to:					
Equity holders of the parent	4 201	16.9	1 632	7.4	157
Non-controlling interests	9	–	22	0.1	(59)

Net sales

Net sales in 2022 were EUR 24 911 million, an increase of EUR 2 709 million, or 12%, compared to EUR 22 202 million in 2021. Supply chain disruptions and semiconductor supply constraints impacted the timing of revenue through the year but following meaningful improvements in the second half of 2022, the year ended with minimal impact from this. In addition to benefiting from foreign exchange rate fluctuations, performance was driven by growth across all four business groups, with particular strength in Network Infrastructure. Mobile Networks and Cloud and Network

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Services both showed solid growth in 2022, while Nokia Technologies also grew, although it benefited from an option exercised in a long-term license that led to an additional EUR 305 million revenue recognition in 2022. Foreign exchange rate fluctuations contributed approximately 6% of the total growth in 2022.

The following table sets forth distribution of net sales by region for the years indicated.⁽¹⁾

For the year ended 31 December	2022 EURm	2021 EURm	2020 EURm	2022 vs. 2021 change %	2021 vs. 2020 change %
Asia Pacific	2 648	2 472	2 652	7	(7)
Europe ⁽²⁾	6 662	6 313	6 092	6	4
Greater China	1 581	1 512	1 497	5	1
India	1 290	1 035	953	25	9
Latin America	1 223	983	954	24	3
Middle East & Africa	1 969	1 771	1 886	11	(6)
North America	8 388	7 187	7 121	17	1
Submarine Networks	1 150	929	697	24	33
Total	24 911	22 202	21 852	12	2

(1) In 2022, Nokia changed the way it presents net sales information on a regional basis. Nokia considers that providing net sales for the Submarine Networks business separately from the rest of the Group improves the usefulness of disclosed information by removing volatility caused by the specific nature of the Submarine Networks business. The comparative information for net sales to external customers by region has been recast accordingly. This change did not otherwise affect the management's discussion of the year ended 31 December 2021 compared to the year ended 31 December 2020 included in the "Operating and financial review" section of the Annual Report on Form 20-F for the year ended 31 December 2021.

(2) All Nokia Technologies IPR and licensing net sales are allocated to Finland.

The following table sets forth distribution of net sales by customer type for the years indicated.

For the year ended 31 December	2022 EURm	2021 EURm	Year-on-year change %
Communication service providers	19 921	17 977	11
Enterprise	1 997	1 575	27
Licensees	1 595	1 502	6
Other ⁽¹⁾	1 398	1 148	22
Total	24 911	22 202	12

(1) Includes net sales of Submarine Networks which operates in a different market, and Radio Frequency Systems (RFS), which is being managed as a separate entity, and certain other items, such as elimination of inter-segment revenues and certain items related to purchase price allocation. Submarine Networks and RFS net sales also include revenue from communication service providers and enterprise customers.

Gross profit

Gross profit in 2022 was EUR 10 222 million, an increase of EUR 1 388 million, or 16%, compared to EUR 8 834 million in 2021. The increase in gross profit was primarily driven by margin expansion in Network Infrastructure, as well as ongoing improvements in cost competitiveness and favorable regional mix in Mobile Networks. Cloud and Network Services and Nokia Technologies also both improved, with Nokia Technologies benefiting from the higher revenue recognition in 2022. Gross profit in 2022 also reflected lower restructuring and associated charges, which amounted to EUR 84 million in 2022, compared to EUR 121 million in 2021. In 2022, variable pay accruals within cost of sales were lower, compared to 2021. Gross margin in 2022 was 41.0%, compared to 39.8% in 2021.

Operating expenses

Our research and development expenses in 2022 were EUR 4 550 million, an increase of EUR 336 million, or 8%, compared to EUR 4 214 million in 2021. Research and development expenses represented 18.3% of our net sales in 2022 compared to 19.0% in 2021. Research and development expenses reflected our commitment to build and maintain technology leadership across our portfolio and were also negatively impacted by foreign exchange rate fluctuations. By business, the increase was primarily related to both Mobile Networks and Network Infrastructure. The research and development expenses in 2022 also reflected lower restructuring and associated charges, which amounted to EUR 37 million in 2022, compared to EUR 62 million in 2021. In 2022, variable pay accruals within research and development expenses were lower, compared to 2021.

Our selling, general and administrative expenses in 2022 were EUR 3 013 million, an increase of EUR 221 million compared to EUR 2 792 million in 2021. Selling, general and administrative expenses represented 12.1% of our net sales in 2022 compared to 12.6% in 2021. The increase in selling, general and administrative expenses was broad-based across businesses and reflected the impact of higher salary expenses and investments made in areas like private wireless, in addition to the negative impact from foreign exchange rate fluctuations. Additionally, the higher selling, general and administrative expenses in 2022 reflected higher amortization of acquired intangible assets, partially offset by lower restructuring and associated charges. In 2022, selling, general and administrative expenses included amortization of acquired intangible assets of EUR 356 million, compared to EUR 335 million in 2021. 2022 included restructuring and associated charges of EUR 52 million, compared to EUR 74 million in 2021. In 2022, variable pay accruals within selling, general and administrative expenses were lower, compared to 2021.

Other operating income and expenses in 2022 was a net expense of EUR 341 million, a decrease of EUR 671 million, compared to a net income of EUR 330 million in 2021. The net negative fluctuation in our other operating income and expenses was primarily due to lower net benefits from Nokia's venture fund investments, the negative impact from foreign exchange hedging and a net negative fluctuation in the amount of loss allowances on trade receivables. In 2022, the net benefit related to Nokia's venture fund investments was approximately EUR 20 million, compared to a net benefit of approximately EUR 190 million in the year-ago period. The impact of hedging was negative EUR 107 million in 2022, compared to a benefit of EUR 45 million in 2021.

Operating profit

Our operating profit in 2022 was EUR 2 318 million, an increase of EUR 160 million, compared to an operating profit of EUR 2 158 million in 2021. The increase in operating profit was due to higher gross profit, partially offset by a net negative fluctuation in other operating income and expenses, higher research and development expenses and higher selling, general and administrative expenses. Our operating margin in 2022 was 9.3%, compared to 9.7% in 2021.

Financial income and expenses

Financial income and expenses were a net expense of EUR 108 million in 2022, a decrease of EUR 133 million, or 55%, compared to a net expense of EUR 241 million in 2021. The net positive fluctuation in financial income and expenses was primarily due the impact of higher interest

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rates on pension plans and interest income, as well as a positive revaluation of embedded derivatives related to foreign currency orders. Financial income and expenses were also impacted by loss allowances and impairments on customer financing loans and the release of cumulative exchange difference related to abandonment of foreign operations, in addition to a change in the financial liability to acquire Nokia Shanghai-Bell non-controlling interest. In 2022, loss allowances and impairments on customer financing loans recognized in the income statement were EUR 61 million, compared to EUR 32 million in 2021. The release of cumulative exchange differences related to abandonment of foreign operations amounted to EUR 20 million in 2022, compared to no impact in 2021. In 2022, the change in liability to acquire Nokia Shanghai-Bell non-controlling interest was positive EUR 11 million, compared to negative EUR 33 million in 2021.

Profit before tax

Our profit before tax in 2022 was EUR 2 184 million, an increase of EUR 258 million compared to EUR 1 926 million in 2021.

Income tax

Income taxes were a net benefit of EUR 2 026 million in 2022, a net positive fluctuation of EUR 2 298 million compared to a net expense of EUR 272 million in 2021. The fluctuation in net income taxes was primarily attributable to the recognition of Finnish deferred tax assets of EUR 2.5 billion that positively impacted 2022, somewhat offset by higher income tax expenses and the absence of a prior year tax benefit related to past operating model integration that benefited 2021.

In 2020, Nokia de-recognized deferred tax assets in Finland, as required, due to a regular assessment of our ability to utilize deferred tax assets in Finland for the foreseeable future, which was done primarily based on our historical performance. At December 31 2022, Nokia concluded, based on its latest assessment, that it is probable that it will be able to utilize the unused tax losses and deductible temporary differences in Finland and re-recognized deferred tax assets of EUR 2.5 billion in the consolidated statement of financial position. For more details, please refer to Note 11, Income taxes, of our consolidated financial statements.

Profit attributable to equity holders of the parent and earnings per share

The profit attributable to equity holders of the parent in 2022 was EUR 4 201 million, an increase of EUR 2 569 million, compared to a profit of EUR 1 632 million in 2021. The change in profit attributable to equity holders of the parent was primarily due to the income tax benefit, the improvement in operating profit and a net positive fluctuation in financial income and expenses.

Our EPS from continuing operations in 2022 was EUR 0.75 (basic) and EUR 0.74 (diluted) compared to EUR 0.29 (basic) and EUR 0.29 (diluted) in 2021.

Results of segments

In 2022, we had four operating and reportable segments for the financial reporting purposes: (1) Network Infrastructure, (2) Mobile Networks, (3) Cloud and Network Services and (4) Nokia Technologies. We also present segment-level information for Group Common and Other. The amounts presented in this "Results of segments" section for each reportable segment and Group Common and Other represent the amounts reported to the management for the purpose of assessing performance and making decisions about resource allocation. Certain costs and revenue adjustments are not allocated to the segments for this purpose. For more information on our operational and reporting structure as well as the reconciliation of reportable segment measures to those of the Nokia Group, refer to Note 5, Segment information, in the consolidated financial statements.

Network Infrastructure

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the segment operating results and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales⁽¹⁾	9 047	100.0	7 674	100.0	18
Cost of sales	(5 739)	(63.4)	(4 990)	(65.0)	15
Gross profit	3 308	36.6	2 684	35.0	23
Research and development expenses	(1 307)	(14.4)	(1 165)	(15.2)	12
Selling, general and administrative expenses	(833)	(9.2)	(765)	(10.0)	9
Other operating income and expenses	(66)	(0.7)	30	0.4	—
Operating profit	1 102	12.2	784	10.2	41

(1) In 2022, net sales include IP Networks net sales of EUR 3 063 million, Optical Networks net sales of EUR 1 891 million, Fixed Networks net sales of EUR 2 943 million and Submarine Networks net sales of EUR 1 150 million. In 2021, net sales include IP Networks net sales of EUR 2 679 million, Optical Networks net sales of EUR 1 708 million, Fixed Networks net sales of EUR 2 358 million and Submarine Networks net sales of EUR 929 million.

Net sales

Network Infrastructure net sales in 2022 were EUR 9 047 million, an increase of EUR 1 373 million, or 18%, compared to EUR 7 674 million in 2021. While net sales in Network Infrastructure benefited from foreign exchange rate fluctuations in 2022, the increase reflected growth across all businesses. Foreign exchange rate fluctuations contributed approximately 8% of the total Network Infrastructure growth in 2022.

IP Networks net sales were EUR 3 063 million in 2022, an increase of EUR 384 million, or 14%, compared to EUR 2 679 million in 2021. Net sales in IP Networks increased in 2022, driven by ongoing technology leadership, with particular strength in North America. IP Networks also saw the first commercial shipments of the new FP5-based IP Routing products in the fourth quarter of 2022.

Optical Networks net sales were EUR 1 891 million in 2022, an increase of EUR 183 million, or 11%, compared to EUR 1 708 million in 2021. The increase in Optical Networks net sales primarily reflected strong demand and customer engagement of our PSE-V solutions. Optical Networks was also impacted by supply constraints, which showed signs of easing in the second half of 2022.

Fixed Networks net sales were EUR 2 943 million in 2022, an increase of EUR 585 million, or 25%, compared to EUR 2 358 million in 2021. The strong growth in Fixed Networks net sales resulted from continued strong fiber deployments, with broad-based growth across most regions.

Submarine Networks net sales were EUR 1 150 million in 2022, an increase of EUR 221 million, or 24%, compared to EUR 929 million in 2021. The increase in Submarine Networks net sales continued to be related to webscale-driven project deployments.

Gross profit

Network Infrastructure gross profit in 2022 was EUR 3 308 million, an increase of EUR 624 million, or 23%, compared to EUR 2 684 million in 2021. Network Infrastructure gross margin in 2022 was 36.6%, compared to 35.0% in 2021. The increase in Network Infrastructure gross profit primarily

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reflected higher net sales and favorable mix shift. In 2022, variable pay accruals within Network Infrastructure cost of sales were lower, compared to 2021.

Operating expenses

Network Infrastructure research and development expenses were EUR 1 307 million in 2022, an increase of EUR 142 million, or 12%, compared to EUR 1 165 million in 2021. The increase in research and development expenses primarily reflected increased investments for technology leadership, inflation and foreign exchange rate fluctuations. In 2022, variable pay accruals within Network Infrastructure research and development expenses were lower, compared to 2021.

Network Infrastructure selling, general and administrative expenses were EUR 833 million in 2022, an increase of EUR 68 million, or 9%, compared to EUR 765 million in 2021. The increase in Network Infrastructure selling, general and administrative expenses largely reflected inflation and foreign exchange rate fluctuations. In 2022, variable pay accruals within Network Infrastructure selling, general and administrative expenses were lower, compared to 2021.

Network Infrastructure other operating income and expenses was an expense of EUR 66 million in 2022, a change of EUR 96 million compared to an income of EUR 30 million in 2021. The change in other operating income and expenses was primarily due to the negative impact from foreign exchange hedging, as well as a net negative fluctuation in the amount of loss allowances on trade receivables.

Operating profit

Network Infrastructure operating profit was EUR 1 102 million in 2022, an increase of EUR 318 million, or 41%, compared to EUR 784 million in 2021. Network Infrastructure operating margin in 2022 was 12.2%, compared to 10.2% in 2021. The strong increase in operating margin was attributable to higher gross profit, partly offset by higher operating expenses and the net negative fluctuation in other operating income and expenses.

Mobile Networks

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the segment operating results and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales	10 671	100.0	9 717	100.0	10
Cost of sales	(6 575)	(61.6)	(6 080)	(62.6)	8
Gross profit	4 096	38.4	3 637	37.4	13
Research and development expenses	(2 234)	(20.9)	(2 078)	(21.4)	8
Selling, general and administrative expenses	(865)	(8.1)	(832)	(8.6)	4
Other operating income and expenses	(57)	(0.5)	38	0.4	—
Operating profit	940	8.8	765	7.9	23

Net sales

Mobile Networks net sales in 2022 were EUR 10 671 million, an increase of EUR 954 million, or 10%, compared to EUR 9 717 million in 2021. While net sales in Mobile Networks benefited from foreign exchange rate fluctuations in 2022, the increase was also driven by improved portfolio competitiveness and strong demand, with particular growth in our products business. While supply chain disruptions and semiconductor supply constraints impacted the timing of revenue through the year, following meaningful improvements in the second half of 2022, the year ended with minimal impact from this. Foreign exchange rate fluctuations contributed approximately 7% of the total Mobile Networks growth in 2022.

Gross profit

Mobile Networks gross profit in 2022 was EUR 4 096 million, an increase of EUR 459 million, or 13%, compared to EUR 3 637 million in 2021. Mobile Networks gross margin in 2022 was 38.4%, compared to 37.4% in 2021. The increase in Mobile Networks gross profit largely reflected higher net sales, ongoing improvements in cost competitiveness and favorable regional mix, somewhat offset by the absence of a EUR 80 million positive impact of a one-time software deal that was completed in the second quarter of 2021. In 2022, variable pay accruals within Mobile Networks cost of sales were lower, compared to 2021.

Operating expenses

Mobile Networks research and development expenses were EUR 2 234 million in 2022, an increase of EUR 156 million, or 8% compared to EUR 2 078 million in 2021. In addition to the negative impact from foreign exchange rate fluctuations, the higher research and development expenses reflected continued investments for technology leadership. In 2022, variable pay accruals within Mobile Networks research and development expenses were lower, compared to 2021.

Mobile Networks selling, general and administrative expenses were EUR 865 million in 2022, an increase of EUR 33 million, or 4%, compared to EUR 832 million in 2021. The increase in Mobile Networks selling, general and administrative expenses largely reflected the impact of higher salary expenses, continued investments and the impact of foreign exchange rate fluctuations. In 2022, variable pay accruals within Mobile Networks selling, general and administrative expenses were lower, compared to 2021.

Mobile Networks other operating income and expenses was an expense of EUR 57 million in 2022, a change of EUR 95 million compared to an income of EUR 38 million in 2021. The change in other operating income and expenses was primarily due to the negative impact from foreign exchange hedging, as well as a net negative fluctuation in the amount of loss allowances on trade receivables.

Operating profit

Mobile Networks operating profit was EUR 940 million in 2022, an increase of EUR 175 million, compared to EUR 765 million in 2021. Mobile Networks operating margin was 8.8% in 2022 compared to 7.9% in 2021.

Cloud and Network Services

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the segment operating results and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales	3 351	100.0	3 089	100.0	8
Cost of sales	(2 011)	(60.0)	(1 929)	(62.4)	4
Gross profit	1 340	40.0	1 160	37.6	16
Research and development expenses	(577)	(17.2)	(537)	(17.4)	7
Selling, general and administrative expenses	(544)	(16.2)	(477)	(15.4)	14
Other operating income and expenses	(42)	(1.3)	20	0.6	—
Operating profit	177	5.3	166	5.4	7

Net sales

Cloud and Network Services net sales in 2022 were EUR 3 351 million, an increase of EUR 262 million, or 8%, compared to EUR 3 089 million in 2021. While net sales in Cloud and Network Services benefited from foreign exchange rate fluctuations in 2022, the growth reflected a strong performance from Enterprise Solutions largely offsetting performances across the other businesses. Foreign exchange rate fluctuations contributed approximately 6% of the total Cloud and Network Services growth in 2022.

Gross profit

Cloud and Network Services gross profit in 2022 was EUR 1 340 million, an increase of EUR 180 million, or 16%, compared to EUR 1 160 million in 2021. Cloud and Network Services gross margin in 2022 was 40.0%, compared to 37.6% in 2021. The increase in Cloud and Network Services gross profit reflected the benefits from operational improvements that have been made across the business. In 2022, variable pay accruals within Cloud and Network Services cost of sales were lower, compared to 2021.

Operating expenses

Cloud and Network Services research and development expenses were EUR 577 million in 2022, an increase of EUR 40 million, or 7%, compared to EUR 537 million in 2021. The increase in Cloud and Network Services research and development expenses largely reflected investments made to strengthen our leadership position in campus wireless, in addition to the negative impact from foreign exchange rate fluctuations. In 2022, variable pay accruals within Cloud and Network Services research and development expenses were lower, compared to 2021.

Cloud and Network Services selling, general and administrative expenses were EUR 544 million in 2022, an increase of EUR 67 million, or 14%, compared to EUR 477 million in 2021. The increase in Cloud and Network Services selling, general and administrative expenses largely reflected investments made to strengthen our leadership position in campus wireless, in addition to the negative impact from foreign exchange rate fluctuations. In 2022, variable pay accruals within Cloud and Network Services selling, general and administrative expenses were lower, compared to 2021.

Cloud and Network Services other operating income and expenses was an expense of EUR 42 million in 2022, a change of EUR 62 million compared to an income of EUR 20 million in 2021. The change in other operating income and expenses was primarily due to the negative impact from foreign exchange hedging, as well as a net negative fluctuation in the amount of loss allowances on trade receivables.

Operating profit

Cloud and Network Services operating profit was EUR 177 million in 2022, an increase of EUR 11 million, compared to EUR 166 million in 2021. Cloud and Network Services operating margin in 2022 was 5.3% compared to 5.4% in 2021. The increase in Cloud and Network Services operating profit in 2022 was due to higher gross profit, partly offset by higher operating expenses and a negative fluctuation in other operating income and expenses.

Nokia Technologies

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the segment operating results and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales	1 595	100.0	1 502	100.0	6
Cost of sales	(5)	(0.3)	(5)	(0.3)	—
Gross profit	1 590	99.7	1 497	99.7	6
Research and development expenses	(214)	(13.4)	(201)	(13.4)	6
Selling, general and administrative expenses	(136)	(8.5)	(92)	(6.1)	48
Other operating income and expenses	(32)	(2.0)	(19)	(1.3)	—
Operating profit	1 208	75.7	1 185	78.9	2

Net sales

Nokia Technologies net sales in 2022 were EUR 1 595 million, an increase of EUR 93 million, or 6%, compared to EUR 1 502 million in 2021. The increase in Nokia Technologies net sales primarily reflects an option exercised within a long-term license. Net sales also benefited from new deals signed in 2022, including positive traction in areas such as automotive, consumer electronics and IoT, and also included some catch-up net sales and one-time transactions. These were somewhat offset by the negative impact of two licensing agreements that ended during 2021 which are in the process of litigation/renewal, along with the impact of market share changes in the smartphone industry, including a company that has exited the smartphone market. Foreign exchange rate fluctuations contributed approximately 1% of the total Nokia Technologies growth in 2022.

As outlined in Note 6, Revenue recognition, of the consolidated financial statements, Nokia has been recognizing revenue each quarter related to a 10-year patent license agreement entered into in April 2014. Under the terms of the agreement the licensee had an option to extend the license agreement for the remaining life of the licensed patents, making it in substance a perpetual license. In the fourth quarter of 2022 they exercised this right. Under the applied accounting policies, the notice triggered revenues of EUR 305 million in the fourth quarter of 2022 that would otherwise have been recognized in future periods. Nokia will therefore no longer recognize revenue in relation to this agreement in future periods.

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Gross profit

Nokia Technologies gross profit in 2022 was EUR 1 590 million, an increase of EUR 93 million, or 6%, compared to EUR 1 497 million in 2021. The higher gross profit in Nokia Technologies was due to higher net sales.

Operating expenses

Nokia Technologies research and development expenses in 2022 were EUR 214 million, an increase of EUR 13 million, or 6%, compared to EUR 201 million in 2021. The increase in Nokia Technologies research and development expenses was primarily due to higher investments to drive creation of intellectual property.

Nokia Technologies selling, general and administrative expenses in 2022 were EUR 136 million, an increase of EUR 44 million, or 48%, compared to EUR 92 million in 2021. The increase in Nokia Technologies selling, general and administrative expenses was primarily due to higher licensing-related and litigation costs.

Nokia Technologies other operating income and expenses in 2022 was an expense of EUR 32 million, a change of EUR 13 million compared to an expense of EUR 19 million in 2021. The change in other operating income and expense was primarily related to a loss allowance on certain trade receivables recorded in 2022.

Operating profit

Nokia Technologies operating profit in 2022 was EUR 1 208 million, an increase of EUR 23 million, or 2%, compared to an operating profit of EUR 1 185 million in 2021. The slight increase in Nokia Technologies operating profit was due to higher net sales, partially offset by higher operating expenses and a net negative fluctuation in other operating income and expense. Nokia Technologies operating margin in 2022 was 75.7% compared to 78.9% in 2021.

Group Common and Other

For the year ended 31 December 2022 compared to the year ended 31 December 2021

The following table sets forth the operating results for Group Common and Other, and the percentage of net sales for the years indicated.

For the year ended 31 December	2022		2021		Year-on-year change %
	EURm	% of net sales	EURm	% of net sales	
Net sales	295	100.0	257	100.0	15
Cost of sales	(307)	(104.1)	(270)	(105.1)	14
Gross profit	(12)	(4.1)	(13)	(5.1)	(8)
Research and development expenses	(117)	(39.7)	(103)	(40.1)	14
Selling, general and administrative expenses	(226)	(76.6)	(213)	(82.9)	6
Other operating income and expenses	37	12.5	204	79.4	–
Operating loss	(318)	(107.8)	(125)	(48.6)	154

Net sales

Group Common and Other net sales in 2022 were EUR 295 million, an increase of EUR 38 million, or 15%, compared to EUR 257 million in 2021. The increase in Group Common and Other net sales was due to Radio Frequency Systems, with particularly strong growth in North America. Foreign exchange rate fluctuations contributed approximately 7% of the total Group Common and Other growth in 2022.

Gross profit

Group Common and Other gross profit in 2022 was negative EUR 12 million, compared to negative EUR 13 million in 2021. Group Common and Other gross margin in 2022 was negative 4.1% compared to negative 5.1% in 2021.

Operating expenses

Group Common and Other research and development expenses in 2022 were EUR 117 million, an increase of EUR 14 million, or 14%, compared to EUR 103 million in 2021.

Group Common and Other selling, general and administrative expenses in 2022 were EUR 226 million, an increase of EUR 13 million, or 6%, compared to EUR 213 million in 2021. In 2022, variable pay accruals within Group Common and Other selling, general and administrative expenses were lower, compared to 2021.

Group Common and Other other operating income and expense in 2022 was an income of EUR 37 million, a decrease of EUR 167 million compared to an income of EUR 204 million in 2021. The lower other operating income in 2022 was primarily related to lower net benefits from Nokia's venture fund investments. In 2022, the net benefit related to Nokia's venture fund investments was approximately EUR 20 million, compared to a net benefit of approximately EUR 190 million in the year-ago period.

Operating loss

Group Common and Other operating loss in 2022 was EUR 318 million, a change of EUR 193 million, compared to an operating loss of EUR 125 million in 2021. The change in Group Common and Other operating loss was primarily attributable to the lower other operating income, as well as higher research and development expenses and selling, general and administrative expenses.

Liquidity and capital resources

Financial position

At 31 December 2022, our cash and cash equivalents equaled EUR 5 467 million, a decrease of EUR 1 224 million compared to EUR 6 691 million as of 31 December 2021. The decrease was primarily attributable to net cash inflow from operating activities of EUR 1 474 million, offset by net cash outflow related to interest-bearing financial investments of EUR 1 198 million, capital expenditure of EUR 601 million, payment of principal portion of lease liabilities of EUR 217 million, dividends of EUR 353 million and share repurchases of EUR 300 million.

At 31 December 2022, our total cash and interest-bearing financial investments* equaled EUR 9 244 million, a decrease of EUR 24 million, compared to EUR 9 268 million as of 31 December 2021. The decrease was primarily attributable to net cash inflow from operating activities of EUR 1 474 million, offset by capital expenditure of EUR 601 million, payment of principal portion of lease liabilities of EUR 217 million, dividends of EUR 353 million and share repurchases of EUR 300 million.

At 31 December 2022, our net cash and interest-bearing financial investments* equaled EUR 4 767 million, an increase of EUR 152 million, compared to EUR 4 615 million as of 31 December 2021. The increase was mainly attributable to net cash inflow from operating activities of EUR 1 474 million and fair value changes of our interest-bearing liabilities due to higher interest rates and stronger USD, partially offset by capital

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expenditure of EUR 601 million, payment of the principal portion of the lease liabilities of EUR 217 million, dividends of EUR 353 million and share repurchases of EUR 300 million.

* Non-IFRS measures. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

Cash flow

The cash inflow from operating activities in 2022 was EUR 1 474 million, a decrease of EUR 1 151 million compared to a cash inflow of EUR 2 625 million in 2021. The decrease was primarily attributable to an increase in cash tied-up to net working capital of EUR 1 843 million in 2022 compared to EUR 268 million cash tied-up in 2021, partially offset by increase in net profit, adjusted for non-cash items, of EUR 3 813 million, an increase of EUR 455 million compared to EUR 3 358 million in 2021. The primary drivers for the increase in cash tied-up to net working capital compared to 2021 were related to an increase in inventories of EUR 991 million compared to an increase of EUR 48 million in 2021 and an increase in receivables of EUR 451 million compared to a decrease in receivables of EUR 239 million in 2021. These were partially offset by a decrease in liabilities of EUR 401 million compared to a decrease of EUR 459 million in 2021. The decrease in liabilities during 2022 was primarily attributable to a decrease in contract liabilities, restructuring and associated cash outflows and liabilities related to variable pay, partially offset by an increase in trade payables.

In 2022, the cash inflow from operating activities included paid taxes of EUR 381 million, an increase of EUR 67 million compared to EUR 314 million in 2021, interest received of EUR 65 million compared to EUR 41 million in 2021 and interest paid of EUR 180 million compared to EUR 192 million in 2021.

The cash outflow from investing activities was EUR 1 880 million in 2022, an increase of EUR 85 million compared to EUR 1 795 million cash outflow in 2021. Cash outflow from investing activities was primarily driven by net cash outflow of EUR 1 198 million of interest-bearing financial investments in 2022 compared to EUR 1 447 million in 2021, cash outflow due to the capital expenditure of EUR 601 million in 2022 compared to EUR 560 million in 2021 and net cash outflow from other non-current financial investments of EUR 66 million compared to net cash inflow of EUR 200 million in 2021.

Major items of capital expenditure in 2022 included investments in R&D equipment, test equipment, hardware for telecommunication and cloud environment, repair or improvements of sites, shipyards and vessels.

In 2022, the cash outflow from financing activities was EUR 837 million, compared to EUR 1 212 million cash outflow in 2021. The cash outflow was primarily driven by dividend payments EUR 353 million, purchase of treasury shares EUR 300 million and payments of the principal portion of lease liabilities EUR 217 million in 2022. In 2021, the cash outflow was primarily driven by payments of long-term borrowings of EUR 927 million and payments of the principal portion of lease liabilities EUR 226 million.

Financial assets and debt

At 31 December 2022, our net cash and interest-bearing financial investments* equaled EUR 4 767 million consisting of EUR 9 244 million in total cash and interest-bearing financial investments*, and EUR 4 477 million of long-term and short-term interest-bearing liabilities.

We hold our total cash and interest-bearing financial investments* predominantly in euro. Our interest-bearing financial investments mainly include high-quality money market and fixed income instruments with strict maturity limits. We also have a EUR 1 500 million revolving credit facility available for liquidity purposes. The facility has no financial covenants and remains undrawn.

At 31 December 2022, our interest-bearing liabilities consisted of EUR 750 million notes due in 2024, EUR 500 million notes due in 2025, EUR 500 million R&D loan from the European Investment Bank maturing in 2025, EUR 250 million R&D loan from the Nordic Investment Bank with final maturity in 2025, EUR 750 million notes due in 2026, USD 500 million notes due in 2027, EUR 500 million notes due in 2028, USD 74 million notes due in 2028, USD 206 million notes due in 2029, USD 500 million notes due in 2039, and EUR 162 million of other liabilities. The EUR notes maturing in 2024, 2025, 2026 and 2028 as well as the USD notes maturing in 2027 and 2039, are issued by Nokia Corporation, while the USD notes maturing in 2028 and 2029 are issued by Lucent Technologies Inc., a predecessor to Nokia of America Corporation (Nokia's wholly-owned subsidiary, formerly known as Alcatel-Lucent USA Inc.). The loans from the Nordic Investment Bank and from the European Investment Bank are drawn by Nokia Corporation. For more information on our interest-bearing liabilities, refer to Note 20, Interest-bearing liabilities, of our consolidated financial statements.

In June 2021, we exercised our option to extend the maturity date of the EUR 1 500 million revolving credit facility. Subsequent to the extension, EUR 1 412 million of the facility has its maturity in June 2026 and EUR 88 million of the facility has its maturity in June 2024.

We consider that with EUR 9 244 million of total cash and interest-bearing financial investments*, and with our undrawn revolving credit facility, we have sufficient funds to satisfy our future working capital needs, capital expenditure, R&D investments, structured finance, venture fund commitments, acquisitions and debt service requirements, at least through 2023. We further consider that with our current credit ratings of BBB- by S&P Global Ratings (at 31 December 2022, BB+), Ba1 by Moody's (at 31 December 2022, Ba2), and BBB- by Fitch, we have access to the capital markets should any funding needs arise in 2023.

We aim to maintain investment grade credit ratings.

* Non-IFRS measures. For the definition and reconciliation of non-IFRS measures to the most directly comparable IFRS measures, refer to "Alternative performance measures" section.

Off-balance sheet arrangements

There are no material off-balance sheet arrangements that have, or are reasonably likely to have, a current or future effect on our financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that are material to investors, except for the purchase obligations and lease commitments, as well as guarantees and financing commitments disclosed in Note 27, Commitments, contingencies and legal proceedings, and in Note 32, Financial risk management, of our consolidated financial statements.

Venture fund investments and commitments

We make financing commitments to a number of unlisted venture funds that make technology-related investments. The majority of the investments are managed by NGP Capital, a global venture capital firm backing exceptional entrepreneurs driving the convergence of the physical and virtual world.

As of 31 December 2022, our venture fund investments equaled EUR 828 million, compared to EUR 758 million as of 31 December 2021. For more information on the fair value of our venture fund investments, refer to Note 21, Fair value of financial instruments, of our consolidated financial statements.

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As of 31 December 2022, our venture fund commitments equaled EUR 433 million, compared to EUR 137 million as of 31 December 2021. As a limited partner in venture funds, we are committed to capital contributions and entitled to cash distributions according to the respective partnership agreements and underlying fund activities. For more information on venture fund commitments, refer to Note 27, Commitments, contingencies and legal proceedings.

Treasury policy

Treasury activities are governed by the Nokia Treasury Policy approved by the President and CEO within the authority granted by the Board of Directors and supplemented by operating procedures approved by the CFO, covering specific areas such as foreign exchange risk, interest rate risk, credit risk and liquidity risk. The objective of treasury's liquidity and capital structure management activities is to ensure that we have sufficient liquidity to go through unfavorable periods without being severely constrained by the availability of funds to execute Nokia's business plans and implement Nokia's long-term business strategy. We are risk-averse in our treasury activities.

Foreign exchange impact

We are a company with global operations and net sales derived from various countries, invoiced in various currencies. Therefore, our business and results from operations are exposed to changes in exchange rates between the euro, our reporting currency, and other currencies, such as the U.S. dollar. The magnitude of foreign exchange exposures changes over time as a function of our net sales and costs in different markets, as well as the prevalent currencies used for transactions in those markets. Significant changes in exchange rates may also impact our competitive position and related price pressures through their impact on our competitors.

To mitigate the impact of changes in exchange rates on our results, we hedge material net foreign exchange exposures (net sales less costs in a currency) typically with a hedging horizon of approximately 12 months. For the majority of these hedges, hedge accounting is applied to reduce income statement volatility.

In 2022, approximately 25% of Group net sales and total costs were denominated in euro, and approximately 50% of Group net sales and total costs were denominated in U.S. dollars. In 2022, approximately 5% of Group net sales and total costs were denominated in Chinese yuan.

The average currency mix for Group net sales and total costs:

Currency	2022		2021	
	Net sales	Total costs	Net sales	Total costs
EUR	~25 %	~25 %	~25 %	~25 %
USD	~50 %	~50 %	~50 %	~50 %
CNY	~5 %	~5 %	~5 %	~5 %
Other	~20 %	~20 %	~20 %	~20 %
Total	~100 %	~100 %	~100 %	~100 %

For the full year 2022 compared to the previous year, the U.S. dollar was stronger against the euro. The stronger U.S. dollar in 2022 on a year-on-year basis had a significantly positive impact on our net sales reported in euros. However, the stronger U.S. dollar also contributed to significantly higher costs of sales and slightly higher operating expenses on a year-on-year basis. In total, before hedging, the stronger U.S. dollar on a year-on-year basis had a positive effect on our operating profit in 2022.

For a discussion of the instruments used by us in connection with our hedging activities, refer to Note 32, Financial risk management, of our consolidated financial statements. Refer also to the "Risk factors" section.

Sustainability and corporate responsibility

We believe that the positive impact of the technology we create and deliver provides our greatest contribution to realizing the United Nations Sustainable Development Goals (SDGs) and outweighs potential negative impacts.

Our products, solutions and services can drive social, environmental, and economic progress. Digitalization and connectivity can have a critical role in solving some of the world's greatest challenges including stalled productivity, climate change and unequal access to opportunity. Our products and solutions bring digitalization to physical industries and cities, helping them decarbonize and increase efficiency, productivity, and safety. We support the energy industry in transitioning to a renewable, smart grid future. Digitalization and connectivity are essential to a more equitable, secure society, providing improved access to healthcare, education and greater potential economic opportunity. They can also play a key role in achieving a cleaner, safer planet with reduced carbon emissions and more efficient use and reuse of natural resources. We work to maximize this positive impact of our technology – our handprint.

At the same time, we understand our responsibility to constantly minimize potential negative impacts of our operations, environmental or social, striving for continuous improvement in product design and responsible business practices employed in Nokia and across our value chain. This is our footprint. We have built robust policies, processes and management systems that align with globally recognized frameworks. Our business model is described in the "Business overview" section of this report.

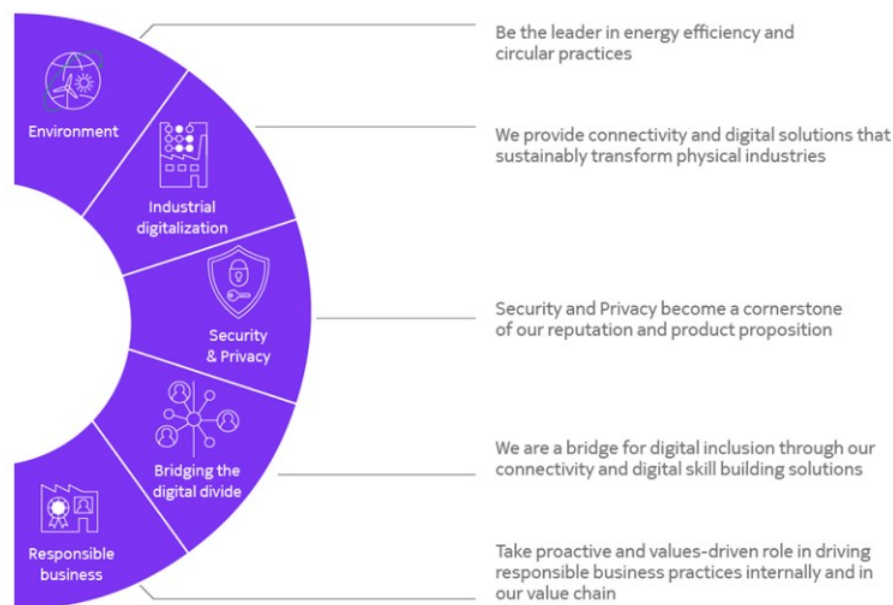
Our purpose, strategy and targets

Our sustainability approach aligns with the topics that are most material to our business and where we have the most impact on sustainable development, providing structure and focus for our activities. At the core of our strategy and approach is our purpose, to create the technology that helps the world act together.

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In 2022, we launched a refreshed ESG (Environment, Social and Governance) strategy and a new mandatory ESG training which was completed by over 97% of employees. The new strategy aims to ensure we maximize our impact in the areas most material to Nokia and is embedded in business and technology strategies and impacts how we make business decisions and develop our products and solutions. The strategy builds on five strategic focus areas where Nokia looks to differentiate and create tangible environmental and social benefits: Environment (climate and circularity), Industrial Digitalization, Security and Privacy, Bridging the Digital Divide, and Responsible Business.

Key strategic ESG areas



In the environment arena, we focus on two areas: climate and circularity. Our greatest source of emissions comes from the use of our products in our customers' networks. To address this, we aim for leadership in energy efficiency, building on work in silicon, software, and systems and opportunities to optimize across the network with energy orchestration and green operations. In circularity we focus on opportunities to promote hardware circularity and manage the sourcing and reuse of key source materials.

Industrial digitalization provides the opportunity to sustainably transform physical industries and cities through digitalization and connectivity. We focus on our offering through our Enterprise solutions for industry and cities that can enable decarbonization, resource efficiency, and safety. This can have a much greater impact on the world's carbon footprint in comparison to reducing our own footprint, though we understand the importance of taking action across both domains.

Security and Privacy are together positioned as the cornerstone of our reputation and product proposition. Product development follows the 'Design for Security' methodology, building security into the life cycle from the very start, with a strict minimum baseline for services delivered to customers. Nokia's customer security team consists of security experts who partner with our customers to build and maintain secure networks, compliant with national regulations for critical telecom infrastructure.

We aim to **bridge the digital divide** using our broad product portfolio and focused partnering with non-terrestrial operations to address different demographics and through digital skill building. Connectivity, combined with digital skills, allows more equal access to healthcare, education and employment for individuals and the opportunity to participate in the digital economy for small businesses.

In **responsible business** we work to ensure our business practices are aligned to our ethical and responsible values. We apply this approach internally, in our supply chain and across our value chain. We collaborate with the aim to improve systemic issues related to environment, mitigating the misuse of technology (and advocating for responsible AI principles), ethics, human rights, inclusion and diversity and working conditions and contributing to the responsible development of new standards.

Our materiality assessment

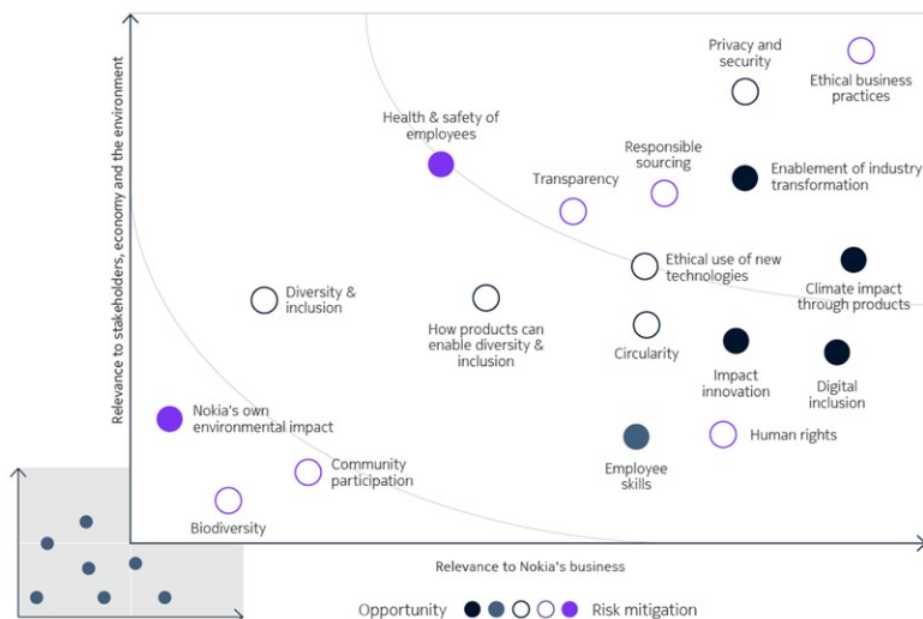
As part of our strategy refresh and in line with good practice, we completed an impact materiality assessment in spring 2022 with an external consultancy. The results of this assessment are based on desktop research into global macro trends that have an impact on sustainable development, interviews and a survey conducted with internal and external stakeholder representatives (including employees, customers, investors, suppliers, partners, non-governmental organizations and academics), and insights from sustainability experts.

The diagram below shows the top right quadrant of this materiality assessment matrix. The top right quadrant shows the topics considered most relevant to our business and to stakeholders, economy and the environment. The most important topics for Nokia are:

- Climate impact through products
- Environmental impact through products and enabling transformation in other industries
- Ethical business practices and ethical use of new technologies
- Privacy and security
- Responsible sourcing

Our new materiality matrix

The topics listed as most important are largely unchanged since the 2019 matrix refresh, with climate, ethical business practices, and how Nokia's products can enable change in other industries, cities and society continuing to be among the most important topics. The most significant growth in importance can be seen in privacy and security, responsible sourcing and circularity. Biodiversity also appeared for the first time in the top quartile of the matrix. The actual potential impact of biodiversity on Nokia business is currently being further investigated.



Sustainable Development Goals



The United Nations Sustainable Development Goals (SDGs) and their targets remain a key framework for our sustainability work. Goals 8, 9 and 13 are the most material for our business and reflect the areas in which we can have the greatest positive impact. We believe digitalization and connectivity will continue to play a critical role in accelerating and achieving all 17 SDGs. More examples of how the work we do actively contributes to all 17 SDGs can be found on our website.

Focus SDGs



Goal 8: Promote inclusive and sustainable economic growth, employment and decent work



As a global company we have significant direct and indirect economic impact. Our direct economic impact includes for example our purchasing from suppliers, wages and benefits paid to our employees, income taxes paid to the public sector, and community investments. The benefits of the technology we provide deliver our greatest indirect impact.

Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

Goal 9 remains the most material SDG for us in the area of helping the world act together and improving people's lives with our technology. It relates directly to the core of our business. The networks we supply to our customers provide access to people everywhere, connecting them to more information, more public services and greater economic opportunities. The connectivity and digitalization our products and solutions provide are critical enablers of sustainable transformation of asset heavy industries including manufacturing.



Goal 13: Take urgent action to combat climate change and its impacts

Climate change is the most significant sustainability challenge for our business and the planet and requires that we put in place the processes and concrete actions to do our part. Through the technology we provide we also help customers, other industries, individuals and society digitalize industrial processes so that they become more predictive and productive, with reduced emissions. We have set an ambitious science-based target (SBT) in line with the 1.5°C warming scenario to reduce our Scope 1, 2 and 3 greenhouse gas emissions by 50% between 2019 and 2030. The SBT also includes reaching net zero by 2050.

Key sustainability targets

Our targets are determined based on our sustainability strategy and are distributed across short-, medium- and long-term. The key targets are listed in the table below.

Progress of selected ESG targets in 2022

Strategic focus area	Target year	Base year	Target	2022 results	Status
Environment					
Climate	2030	2019	Our Science-based target (SBT): Reduce our greenhouse gas (GHG) emissions across our value chain (Scope 1, 2 and 3) by 50% between 2019 and 2030, and reach net zero by 2050.	Emissions covered by our SBT were 37 627 000 tons CO ₂ e ⁽¹⁾ which, as anticipated, are 13% above our cumulative carbon budget for 2020–2022, if a linear reduction from 2019 is expected annually. Total emissions however remained at the same level as in 2021. However, we do not expect the reduction of emissions in our value chain to be a linear process. We aim to achieve our target of 50% reduction in emissions by 2030 as we expect to see greater impact as more energy efficient products and features of our portfolio are adopted and decarbonization of the electricity grid is expected to continue globally.	Not on track
	2030	2019	Our final assembly suppliers reach net zero emissions by 2030.	Our final assembly supplier emissions were 46 000 tons CO ₂ e which is a 39% reduction from 2019.	On track
	2030	2019	Our suppliers' reduce GHG emissions by 50% by 2030. ⁽²⁾	Our suppliers' emissions were 683 700 tons CO ₂ e which is 78% reduction from 2019. However, as this includes emissions data from hundreds of suppliers and the quality of allocated emissions data has been of concern, we are conscious that some of the reductions may be due to the quality of the data reported.	On track
	2022	N/A	Reach 60% renewable electricity in our own facilities.	Reached 63% renewable electricity in our own facilities.	Achieved
	2022	2019	45% reduction of facility GHG emissions.	Reduced 54% of facility GHG emissions.	Achieved
	2022	N/A	Divert 75% of facility waste from landfill.	80% of facility waste was diverted from landfill.	Achieved
Bridging the digital divide					
Connecting the unconnected and under-served	2030	2021	Help our customers to connect the next 2 billion measured by number of subscriptions in Nokia radio customers' networks by 2030.	In line with Nokia's long term goal, we work with our customers to provide broadband based digital services on more subscriptions. The number of mobile broadband subscriptions in Nokia radio customers' networks has increased from 2021 to end of 2022 by 400 million ⁽³⁾ .	On track
	2025	2021	Harness Nokia technology, capabilities and funds to improve the lives of 1 500 000 through social digitalization projects, digital skill building, and connecting the unconnected or underserved by 2025. ⁽⁴⁾	We reached 560 702 direct beneficiaries through social digitalization projects, building digital skill inclusion, connecting the unconnected or underserved and improving inclusion, equity and diversity.	On track
Responsible Business					
Health & Safety	2030	2016	100% of suppliers delivering high risk activity to meet "H&S preferred supplier" status (score 4 or more out of 5) in our Health & Safety maturity assessment.	21% of relevant suppliers met H&S preferred supplier status.	On track

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Inclusion & Diversity	2022	N/A	Reach minimum of 26% female hires in all global external recruits.	27% of external recruits were women. We achieved the 2022 target via increased marketing, communication and talent attraction activities to make Nokia's employer brand stand out for diversity-friendly employment policies and attract diverse talent.	Achieved
Ethics & Compliance	2030	2016	Reach 85% favorability of employee/line manager engagement on ethics and compliance.	Progress against the target was measured as favorable responses to the following question in our employee survey: "My line manager sets a positive example by acting with integrity." 88% of the responses were favorable.	Achieved
	2022	N/A	Ethical Business Training (EBT) completed by 95% of employees.	98% of employees completed the training.	Achieved
Human Rights	2022	N/A	Complete our second Global Network Initiative (GNI) assessment and, as a result, Nokia deemed to have shown good faith efforts to implement the GNI principles in freedom of expression and privacy.	We completed our second Global Network Initiative independent assessment earlier and are proud to report that the GNI board found we have made good faith efforts to implement the GNI Principles on freedom of expression and privacy with improvement over time.	Achieved
Responsible sourcing	2025	2020	80% of suppliers achieve satisfactory sustainability score (based on aggregated weighted share) from supplier performance evaluation (includes performance across our sustainability assessment programs such as EcoVadis, CDP, Conflict minerals).	78% of suppliers received satisfactory sustainability score in our assessment programs on average.	On track

(1) CO₂e = carbon dioxide equivalents

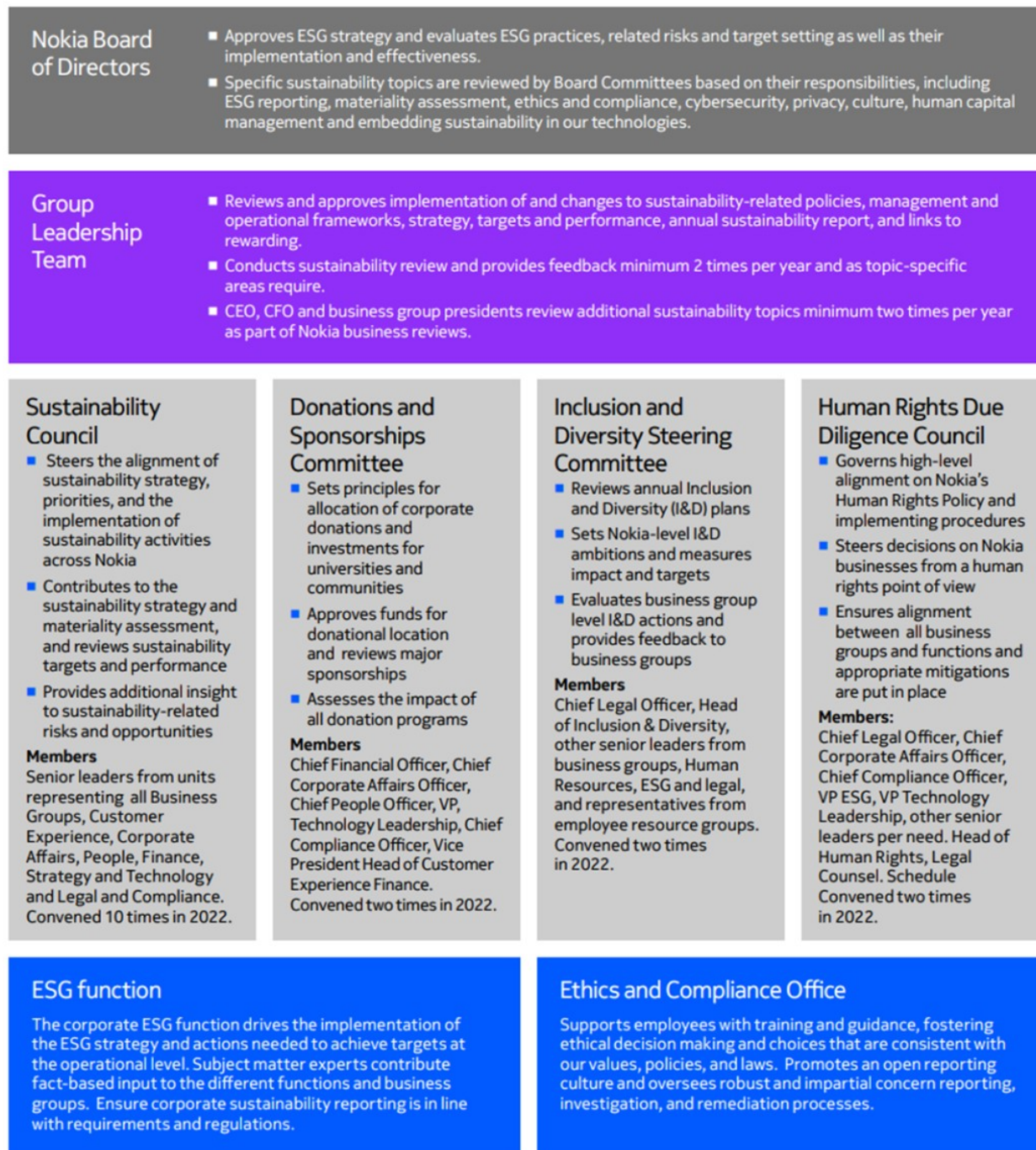
(2) Refers to our material suppliers

(3) Reference Source: GSMA Intelligence

(4) Improving lives refers to increased digital connectivity and inclusion for 1 500 000 people

Sustainability governance

The Board of Directors evaluates the Company's sustainability-related risks and target setting as well as their implementation and effectiveness in Nokia. In 2022, the Board approved the selected key sustainability targets on climate change and diversity (included in the short-term incentive program), social impact budget, the new materiality matrix and reviewed the sustainability strategy and targets, evolving ESG (environmental, social and governance) requirements and expectations, investor feedback and disclosure approach. In addition, the Board Committees monitor environmental and social developments and activities in the Company in their respective areas of responsibilities. In 2022, the Chief Corporate Affairs Officer had overall responsibility for sustainability in the Group Leadership Team (GLT). In line with our new mode of operation, the GLT approves sustainability-related strategy, overall targets and operational frameworks, within which corporate functions and business groups can operate. This enables accountability and empowerment of each business group whilst maintaining appropriate strategic and operative oversight. Independent councils and committees, such as the Sustainability Council, are used to steer, align and ensure the implementation of these strategies, targets and frameworks and make recommendations to the GLT. Our overall sustainability governance framework and responsibilities are shown in the diagram below.



Risk management

Sustainability related risks and opportunities are part of our Enterprise Risk Management framework. We recognize and aim to mitigate the potential risks and negative impacts associated with our business whether related to technology, supply chain, climate or people, while also driving the opportunities within and beyond our business to contribute to achieving the UN Sustainable Development Goals. We have clear policies and processes for each identified material sustainability related risk, including our Code of Conduct which reflects our values through clear and simple directions on ways of working for all employees and business partners. The main features of our risk management systems are described as part of our Corporate governance statement (see Corporate Governance—Risk management, internal control and internal audit functions at Nokia). In addition, the “Risk factors” section of this report provides discussion on the most important risk factors affecting our operations. These risks include sustainability-related issues such as:

- product safety
- environmental incidents
- health & safety
- privacy and security, including cybersecurity threats
- potential human rights abuse through misuse of the technology we provide
- potential lack of proper respect for human rights, fair labor conditions, the environment and communities in our operations and supply chains
- non-compliance with regulations or our supplier and customer requirements
- violation of ethical standards, including our Code of Conduct
- labor unrest and strikes
- inability to retain, motivate, develop and recruit appropriately skilled employees
- purchasing boycotts and public harm to our brand
- issues with tariffs and taxation, including tax disputes
- disruptions in our manufacturing, service creation, delivery, logistics or supply chain caused, for instance, by natural disasters, military actions, civil unrest, public health and safety threats (including disease outbreaks), many of which may be fueled by the adverse effects resulting from climate change.

How these risks are managed, including related key policies and actions, is further discussed in the following paragraphs, in the context of relevant topics.



Environment

Our greatest impact on the environment lies in the role our products and solutions play in helping to decarbonize and dematerialize other industries and cities. This is what we call our environmental handprint and is achieved through the sustainable transformation of industries and society. More information on how we address this can be found in the industrial digitalization section below.

To address our own footprint, we focus on both climate and circularity where we aim for leadership in the energy efficiency of our products and circular practices.

Climate

Climate change remains a significant risk to society and the natural environment. Climate change can negatively impact our supply chain and our customers' business, as well as the global economy, and political and social stability. We recognize that the products and services we provide globally may affect the environment and climate as manufacturing, distributing, and operating these products require energy and other natural resources. In 2022, 95% of our greenhouse gas emissions footprint came from our products in use by our customers in their networks. We can directly impact our footprint by constantly improving power consumption, increasing energy efficiency and driving innovation. For example, in 2022 we announced the commercial availability of our liquid cooling solution across our AirScale radio base station offering. This innovative solution can reduce the energy used by the cooling system at a base station site by up to 90%.

We continue to also innovate in terms of the silicon, software and hardware we develop. During the year other innovations included:

- AVA for Energy SaaS which applies artificial intelligence to reduce energy consumption across the network
- Our FP5 network processor in IP service routing platforms
- Our Quillion chipset reduces power consumption for fiber broadband products by 50%, and has been adopted by 100% of our customer base
- New Intelligent Radio Access Network Operations solution designed to manage the increasing complexity of 5G networks, including energy, through machine learning (ML)

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Our own operations are a minor part of our footprint (around 1%) and are less prone to the impact of natural catastrophes and severe weather, but we still work hard to reduce our own operational footprint. In 2022 we joined the RE100 initiative in line with our global ambition to use 100% renewable electricity across our facilities by 2025 and we were recognized with the initiative's best newcomer award during climate week in New York.

Our climate achievements

We have set a science-based greenhouse gas (GHG) emission reduction target through the Science Based Target (SBT) initiative. Our target is to reduce our emissions by 50% between 2019 and 2030 across our value chain (Scope 1, 2 and 3).

In 2022, our Scope 1 GHG emissions were 124 000 tons CO₂e and market-based Scope 2 emissions were 135 300 tons CO₂e. At the end of 2022, our progress on Scope 2 emissions was better than expected as we continue to make significant improvements in our own operations. Our Scope 3 emissions were 39 454 200 tons CO₂e, decreasing from the previous year.

However, we are not on track with our SBT as anticipated as we were 13% above our cumulative carbon budget for 2020–2022 if a linear reduction from 2019 is expected annually. We do not expect the reduction of emissions in our value chain to be a linear process. We continue to work to stay within the 2020-2030 cumulative carbon budget and achieve our target of 50% reduction in emissions by 2030 as we expect to see greater impact as more energy efficient products and features of our portfolio are adopted and decarbonization of the electricity grid continues globally.

Beyond improvements in product energy efficiency, modernization of legacy networks also drives improved energy efficiency, and the customer base station sites we modernized in 2022 used on average 44% less energy than those where our customers did not modernize. The number of modernized products is based on the number of radio network products replaced at customer sites for which the data is available in a global product deployment database for the reportable year. The average power consumption of radio network products is based on ETSI standard 202706 defined measurements.

We also work with our suppliers to reduce our upstream indirect emissions and to drive circular practice and innovation with our suppliers. In 2022 we continued and enhanced our supplier climate engagement and saw 481 of our key suppliers responding to CDP's request to disclose their climate performance information and 278 also provided emission reduction targets. We also had 276 suppliers responding on the CDP Water security questionnaire. To move forward with climate-related targets, we also encouraged suppliers to set climate targets to be in line with the Science Based Targets initiative and recognized climate-related innovations as part of our Supplier Diamond Awards Program. With our final assembly suppliers, we worked on developing roadmaps for realizing their 2030 zero emissions targets.

In logistics, to help us reduce our emissions we partnered with our logistics service providers to further develop biofuel-based transportation solutions and continued to implement lower emission flights using Sustainable Aviation Fuel.

Circularity

We also aim to be a driver of circular practices in our industry. We focus on opportunities to promote hardware circularity by managing the sourcing and reuse of key source materials. We build on our existing waste processes and circular products and services offering, proactively increasing the take back of products from customer modernization projects and end of life equipment and increase the availability and sales of refurbished products. We also look to increase the use of recycled materials in our products, augmenting the inclusion of recycled plastics, steel, copper and aluminum in our mechanical parts.

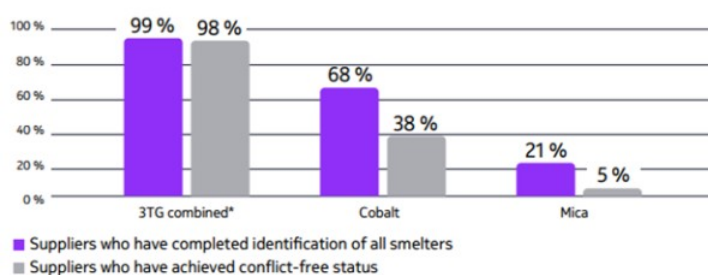
Highlights

In 2022, we introduced a new circular metric to guide our operational circularity journey and to close the material loop. Our new target is to reach 95% waste circularity rate in 2030.

Our new circularity target includes waste across our value chain: from our own top 20 sites based on waste production, including own final assembly factories, supply chain final assembly factories, installation projects at customer sites and product takeback. The new target maximizes recycling and recovery of waste so that waste disposal is minimized. During 2022, we concentrated on increasing circular waste data availability.

We also introduced our waste circularity target to our final assembly suppliers and began performance monitoring and setting long-term targets. We also focused on identification of prioritized materials and relevant suppliers where we want to focus further to decrease the dependency on virgin materials and increase the uptake of recycled materials in our mechanical parts, currently prioritizing aluminum, steel, copper and plastics.

Share of suppliers who have completed identification of all smelters and have achieved conflict-free status



* 3TG combined shows the 4 minerals together (Tantalum, Tin, Gold and Tungsten), and is core to our reporting.

Targets:

In 2022, we achieved 98% tin, tantalum, tungsten and gold traceability and conflict-free status and extended due diligence to cobalt and mica.

2025: We target to achieve 98% tin, tantalum, tungsten and gold traceability and conflict-free status, with extended due diligence to cobalt and mica and two additional minerals.

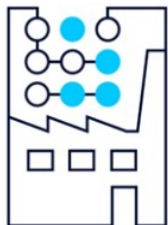
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As part of our drive for refurbishment and reuse of products in 2022, we sent around 2 900 metric tons of old telecommunications equipment for materials recycle, and we refurbished or reused approximately 88 900 units with a combined total weight of 400 metric tons.

We announced the opening of a repair and maintenance hub in Saudi Arabia, providing another key component of the circular ecosystem in the region.

We continue to align our climate-related disclosures in our CDP report according to the guidance of the Task Force on Climate-related Financial Disclosures (TCFD). CDP is a global organization that runs a bespoke global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts.

We have in place a robust environmental management system and environmental policy, supported by documented processes and procedures to ensure their implementation. The system helps us to monitor our progress and identify needed improvements. Our own operational footprint is certified under the ISO 14001:2015 environmental management system standard and at the end of 2022 the coverage of employees within the scope of that certification was 86%.



Industrial digitalization

Digitalization and connectivity are a critical part of the solution to decarbonizing and dematerializing physical industries which significantly contribute to global carbon emissions. This is our handprint and represents the enablement effect of the technology solutions we provide. We aim to maximize this handprint as it provides our greatest potential impact on climate change.

As part of our strategy we provide low latency connectivity, private wireless networks, sensors and AI/ML as the basis of a 'Green Digital' proposition in our Enterprise portfolio. We are working within our ecosystem to identify methodologies that better measure the enablement effect and articulate the business case for transformation to accelerate and scale adoption.

Nokia's own Oulu factory in Finland is a fully digitalized factory that has been recognized as a WEF lighthouse, and an example of the impact digitalization can bring. It incorporates all 5G+ technologies to drive machining and assembly, using robotics, autonomous transportation through mobile robots, advanced quality control methods including video analytics, and maintenance schedules driven by augmented Intelligence/machine learning recommendations based on real-time asset condition data.

According to the latest data gathered in 2022, the Nokia Oulu factory output has increased by 250% since 2015 whilst maintaining the same level of resources and energy consumption. We saw a reduction in energy consumption per produced product. In addition, both process defects and product time to market have been reduced by half. Besides the environmental benefits, the factory has also experienced efficiency gains through the reduction of robot lead time by 80%, and it has reduced staff floor time by 20%, leading to greater worker safety.

We work with customers across the energy, manufacturing, transportation and other industries as we underline the belief that there is no green without digital. As of the end of 2022, we have provided connectivity and digitalization solutions to 2 600 enterprise customers.



Bridging the digital divide

Despite the accelerated uptake of digitalization during the pandemic, the digital divide widened both for individuals and for many small and medium-sized enterprises (SMEs) who were not able to participate in the digital economy.

Nokia aims to be a bridge for digital inclusion by bringing both our connectivity and digital skills building solutions to create more inclusive access to healthcare, education and employment for individuals. We aim to also enable potential new business opportunities for SMEs. We can achieve this by leveraging our broad product portfolio, as well as focused strategies with non-terrestrial network operators to connect different demographics to broadband level speeds in both fixed and wireless domains.

Nokia can also build on its existing training assets, certifications and social initiatives to support digital skill building. Since its launch in 2020, over 40 000 individuals have registered for the Nokia 5G certification learning program. As SMEs digitalize, and ensure their employees upskill and increase their knowledge of digital technologies, this is also expected to be critical to retention and growth.

As part of our focus on bridging the digital divide, we created new targets with medium- and long-term focus.

- By 2025, we target to improve the lives of 1.5 million through social digitalization projects, digital skill building, and connecting the unconnected or underserved

■ By 2030, we aim to provide broadband based digital services with 2 billion subscriptions

Our social initiatives in 2022 reached 614 149 direct beneficiaries across the world. This work included 110 programs in 34 countries.

Security and Privacy



In our refreshed ESG strategy we position security and privacy as the cornerstone of our reputation and product proposition. We will work to ensure a common security baseline enforced for all products and services and accelerate our security strategy ambitions. This involves reinforcing the Nokia Design for Security framework and driving end-to-end product security testing initiatives like the Advanced Security Testing and Research (ASTaR) Lab, as well as leveraging our own innovative portfolio offerings.

In the 5G era, the nature and scale of information networks are evolving, as are the nature and scale of security threats. 5G will interconnect countless new devices, empower new industries, and enable a myriad of new applications and use cases. As one consequence, more avenues of attack are available for cyber criminals to compromise critical infrastructure, including the telecommunications infrastructure. Threats and vulnerabilities do not only show up in the individual network components but can also be exploited in the overall solution. Nokia has taken a new step in safeguarding 5G against such threats by creating the ASTaR Lab. The ASTaR Lab is the first end-to-end 5G testing lab in the United States focused solely on cybersecurity and a concrete testimony of Nokia's commitment to making security a foundational pillar of Nokia's technology strategy and a differentiator in the marketplace. Nokia continuously develops and improves its processes and tools used in product development and has made Design for Security (or DFSEC) an integral and fundamental part of it. Throughout 2022, product security and DFSEC requirements have been further enhanced to meet the latest industry standards.

Nokia's cyber resilience refers to its ability to identify, respond, and recover swiftly from a security incident, aiming to ensure Nokia and its customers can retain business continuity and recover to normality quickly in case of a security incident.

We have a Nokia managed Cyber Defense Center covering Nokia activities, public Cloud, R&D labs and Nokia Data Centers, as well as a Computer Emergency Response team addressing critical security incidents. Nokia developed and maintain an actionable Cyber Resilience Plan, built on an assessment of the cyber risks the business is most likely to experience, leveraging Nokia's emergency policies, plans and procedures.

As a trusted partner in security for our customers, we aim to meet key regulatory and customer requirements. Nokia's 2022 information security strategy, cyber risks and programs, which are periodically reported to the executive management level and Board of Directors, embed strong governance and compliance requirements. Our security ambition is reflected in the supplier selection processes, contracts and supplier assessments targeted to ensure effective security to be in place in our supply chain and with our Third Parties. Nokia relies on enforced security policies and standards, security training and programs to ensure the protection of our key data and intellectual property. By the end of 2022, around 98% of our employees across all locations completed the Information Security Awareness Training. Nokia has elevated its customers' trust through the set-up of a security operations governance for customer services, and a security baseline, leading to ISO27001 certification for selected services to assess our capability to keep up with the ever-increasing market legal and regulatory demands.

In privacy, we have established a comprehensive company-wide privacy program based on respecting privacy rights and exercising high standards of integrity in dealing with and protecting personal data, set out in core principles that are based on relevant laws, best practices, and standards. We conduct privacy assessments that aim to mitigate privacy risk in relation to the data we collect, process, and store. We observe the concept of data minimization, meaning we endeavor only to collect personal data that is necessary for the purposes for which it is collected and to retain such data for no longer than is necessary. We implement appropriate controls to ensure that only persons with a clear and justifiable need to know can access personal data. We have formal processes and procedures in place to manage and mitigate any related risk to data subjects in the event of a personal data breach.

These processes also include mechanisms to communicate in a timely fashion with supervisory authorities, should that be required. A program of privacy awareness and general and targeted role-based training ensures we continuously and effectively address areas of the highest privacy impact. Our mission is to protect and safeguard personal data in Nokia's possession, and we have a network of certified privacy professionals who regularly provide coaching on privacy.



Responsible business

Our Highlights

Around 98% of our employees completed the Ethical Business Training.

In 2022, we implemented 479 supply chain audits, including 67 onsite in-depth audits on corporate responsibility topics, 33 onsite audits against our supplier requirements and 379 supplier assessments conducted using the EcoVadis scorecards.

We successfully completed our second independent external Human Rights assessment for the Global Network Initiative (GNI). The assessment found Nokia showed good faith efforts over time to implement the GNI Principles on freedom of expression and human rights.

Of the Human Rights Due Diligence (HRDD) cases investigated in 2022, 55% were resolved as "Go," 31% as "Go with conditions" and 11% as "No Go."

We launched our six-pillar approach to responsible AI and the Nokia Technology Ethics Advisory Board.

We improved our hiring and in December 2022, women represented 26.6% of the external hires.

Our enhanced ESG strategy builds upon our existing practices where we look to take a proactive and values-driven approach to responsible business practices both internally and working closely with our value chain, targeting to improve fundamental issues in the value chain. These include environmental risks, technology risks, and human rights risks where we drive responsible and ethical practice and procedures.

Ethics and compliance

We aim to conduct our business with the highest standards of business ethics and integrity. Our comprehensive compliance program and our strong culture of integrity allow us to earn and keep the trust of our customers, governments, employees and other stakeholders. Our Code of Conduct provides the framework for our commitment to integrity by uniting all leaders and employees behind a common vision and set of values. Our Code of Conduct sets out four straightforward defining principles: 1) we follow the laws where we do business; 2) we set an example for one another by being honest and fair; 3) we promote a culture of integrity through mutual respect and trust; and 4) we hold each other accountable to adhere to the Code of Conduct and report potential violations. These principles are supplemented by 14 key business policy statements covering critical issues and risks we face (see the picture on the right).

Our Code of Conduct and the 14 main policy areas

We do business the right way

- Conflicts of interests
- Dealing with government officials
- Fair competition
- Improper payments (Anti-corruption)
- Trade compliance
- Working with third parties

We respect our people and community

- Environment
- Fair employment
- Health, safety & labor conditions
- Human rights
- Privacy

We safeguard our assets

- Controllorship
- Intellectual property & confidential information
- Insider trading

[We do business the right way](#)

A separate Code of Ethics sets out further expectations of our President and CEO, Chief Financial Officer and Corporate Controller. We also have a Third-Party Code of Conduct and training material that applies to our suppliers and partners and clearly state our expectations regarding ethical conduct. All suppliers are informed about the Third-Party Code of Conduct and training material during the contract agreement stage, and Nokia sales partners, who are screened by our Anti-Corruption Center of Excellence (CoE) team, are required to certify that they have read the Third Party Code of Conduct. Our Codes are further supplemented by policies, procedures, and guidance documents covering a range of topics, such as third-party screening procedures and corporate hospitality.

In 2022, we continued our longstanding practice of providing annual training to our employees on ethical business practices. Our Workplace Ethics and Integrity Training was completed by around 98% of our employees, surpassing the agreed target of 95%.

We supplement our mandatory training with targeted training that addresses high risk areas, regulatory requirements, and critical and emerging needs. We use a combination of videos, in-depth training modules, microlearning modules, and live training sessions to educate employees about high-risk areas. In 2022, more than 11 000 attendees received live training with over 600 compliance topics covered in about 200 sessions. We developed short, animated "just-in-time" training modules that focus on select topics and are triggered by specific employee actions; for example, raising a concern through our Ethics Helpline will prompt a short training on the investigation process.

[Anti-corruption and bribery](#)

We do not tolerate corrupt behavior by our employees, partners, or suppliers. Improper payments are strictly prohibited. We employ a multi-faceted approach to prevent corruption. We have clear and unequivocal policies concerning improper payments, facilitation payments, gifts and hospitality, sponsorships and donations, and other areas of corruption risk.

We carry out training and regularly communicate with our employees regarding legal and compliance risks, and we review these risks and our mitigation measures with the company's senior leadership and Audit Committee of the Board of Directors. Online training on preventing bribery and corruption was included in our 2022 "Workplace Ethics and Inclusion" mandatory training for all employees. We conduct periodic audits and risk assessments to ensure that we identify and respond to corruption risks across our operations. Our compliance operations reviews are comprehensive assessments of compliance risk within regions and business groups. Compliance control framework assessments are site or business reviews that focus on identifying anti-corruption risks and developing, implementing, and monitoring responsive mitigation controls. We also carry out risk-based due diligence and monitoring procedures for different categories of third parties (such as suppliers and business partners) to assess and manage potential risks related to engaging and working with them. In 2022, we completed four compliance operation reviews and 13 compliance control framework assessments, which assess the effectiveness of our compliance processes and risk mitigants.

The Anti-Corruption Center of Excellence (CoE) is a dedicated group within our compliance team that assesses, monitors, and approves or rejects engagement with high-risk third parties (including, but not limited to, commercial third parties and high-risk suppliers), as well as practices such as gifts, entertainment, hospitality, sponsorships and donations. Potential customers are screened to identify risks related to such matters as money laundering, terrorism financing, and human rights abuses. The activities of the CoE are digitalized and tool-based, including, for example, monitoring and training of third parties. Third parties must adhere to our Third-Party Code of Conduct, and they are required to sign our anti-corruption certification annually. In 2022, over 200 of our Nokia sales partners certified that they read the Third-Party Code of Conduct and completed the training video. In addition, as necessary, live discussions on effective compliance programs are held with our partners with the goal to exchange best practices.

[Oversight and grievance mechanisms](#)

Our Board of Directors and its Audit Committee and our executive leadership team all provide oversight of our ethics and compliance program. Our Chief Compliance Officer provides periodic reports and updates concerning compliance programs, investigations, and evolving external enforcement and risk trends to the Board, Audit Committee and others, as needed. Employees are expected and encouraged to report concerns about ethical misconduct, potential violations of the law, our Code of Conduct, or our company policies. We provide numerous channels and mechanisms to facilitate such reporting, including the means to report anonymously (unless prohibited by local law), and we strive to ensure that employees feel comfortable reporting concerns. Our global Ombuds program helps drive our 'speak-up' culture and allays any concerns employees may feel about potential reprisal for having filed a report.

In 2022, we received 1033 concerns, of which 360 were investigated by our Business Integrity Group (our investigations team in the compliance organization) as alleged violations of our Code of Conduct. In 2022, the Business Integrity Group closed 300 investigations into alleged violations of our Code of Conduct, 131 of which were substantiated with cause found after investigation. We also implemented corrective actions including dismissals and written warnings following investigations conducted by the Business Integrity Group. Beyond individual discipline, these investigations resulted in detailed root cause analysis, and remedial measures and improvements were identified and monitored for implementation.

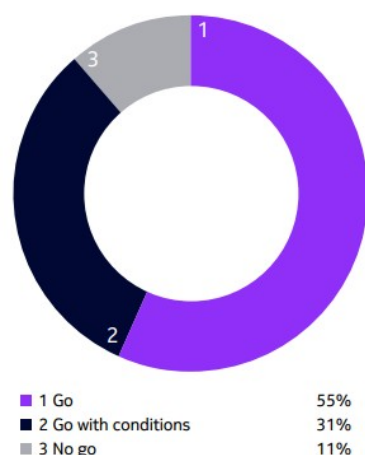
[Human rights](#)

We are committed to the principles of the Universal Declaration of Human Rights, the United Nations Global Compact, and the Organisation for the Economic Co-operation and Development (OECD) guidelines for Multinational Enterprises. We encourage our suppliers and business partners to share these values. We endorsed the United Nations Guiding Principles on Business and Human Rights in 2011. Our Code of Conduct together with our Human Rights Policy sets out our approach to human rights. Our human rights processes cover the whole value chain, from supplier management to product end use and we have set clear requirements for all areas separately.

The technology we provide can bring positive benefits to individuals and society as a whole. We have a robust Human Rights Due Diligence process that aims to ensure the technology we provide is not misused to limit the privacy or freedom of expression of any individual or group.

Our Human Rights Due Diligence (HRDD) process, which is embedded in our global sales process, provides the mechanism and tools to effectively mitigate our most salient human rights risks arising from the potential misuse of the products and technology we provide. Before any sale is made, we aim to identify the level of possible risk to human rights through potential misuse of our technology and provide mitigation if any risk is identified. The HRDD process is initiated according to various triggers including technology type, customer, country and use case. Of the cases handled by HRDD in 2022, 55% were resolved as 'Go', 31% as 'Go with conditions', and 11% as 'No go'. In addition to potential product misuse, human rights risks appear in our global supply chain. Our supply chain risks and activities are further discussed in the Responsible Sourcing section below and in a separate modern slavery statement published on our website.

Cases handled by the Human Rights Due Diligence process and how they were resolved



We are a member of the Global Network Initiative (GNI), a multi-stakeholder group of companies, civil society organizations (including human rights and press freedom groups), investors, and academics working together to protect and advance freedom of expression and privacy in the ICT sector. In 2022, we successfully completed our second independent assessment for the GNI and were found to have shown good faith efforts over time to implement the GNI Principles on freedom of expression and human rights.

In 2022, Nokia strongly condemned the Russian invasion of Ukraine. Our Ukrainian employees helped maintain customer networks and provide critical connectivity for their country. It became clear in the early days of the invasion that our continued presence in Russia would no longer be possible, so we took the decision to exit the Russian market in a responsible way.

Responsible sourcing

We expect our suppliers to adhere to our Third Party Code of Conduct and provide them with our Supplier Requirements, including the Responsible Business Alliance (RBA) Code of Conduct and additional, Nokia-specific sustainability requirements. The requirements cover such topics as environment, health, safety and security, privacy, risk management, labor and human rights management, modern slavery and ethics. We also run assessments and audits on our suppliers and provide training to ensure they meet our ethical requirements and continuously improve on their performance. We also work with our suppliers on remediation actions and push to raise the bar on standards across our ecosystem.

While COVID-19 and related precautions are still limiting the possibility of conducting onsite audits in certain regions, we continue to assess and monitor our suppliers. COVID-19 also heightened the potential risks of both child and informal labor. In 2022, we implemented 479 supply chain audits (439 in 2021), including 67 onsite in-depth audits on corporate responsibility topics, 33 onsite audits against our supplier requirements and 379 supplier assessments and follow-ups conducted using the EcoVadis scorecards. We also ran training workshops for suppliers including topics such as climate change, circularity, responsible minerals sourcing, modern slavery, labor migration, diversity and inclusion, and health and safety.

Our People

Our Highlights

In 2022, we communicated our new people strategy, which puts our employees at the heart of everything we do. The aim is to create a working environment in which everyone can thrive.

In 2022, Nokia launched two new global minimum standard benefits: 1) in support of inclusion and diversity, equal childcare benefits are now offered to all employees regardless of their gender, and 2) company-provided life insurance of one year's capped base salary is now offered to all employees regardless of country.

At Nokia, we care about our people and believe they are critical to the long-term sustainability and competitiveness of our company. We aim to hire and retain the best talent and provide a work environment where each person can thrive. The foundation of our culture is based on the Nokia essentials which incorporate our values and determine how we, both as a company and as individuals, interact with each other and the world around us. The essentials reflect how it should feel to work at Nokia, and what we want our customers, suppliers and partners to experience working with us.

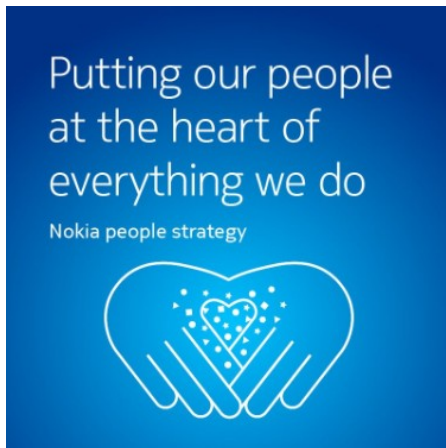
The essentials

Open - I am open in mindset: to opportunity, to the future and evolving market needs, to new approaches, and to collaborate.

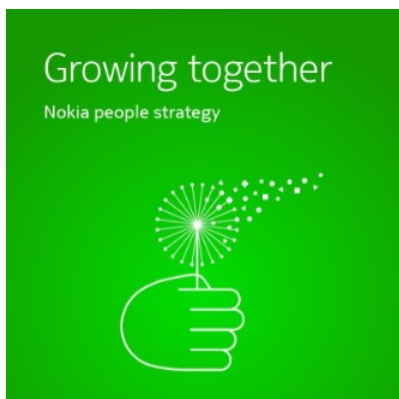
Fearless - I am fearless and bring my authentic self to work, sharing my ideas and opinions and knowing that mistakes are OK as long as we can learn from them.

Empowered - I am empowered and supported to make decisions and own my work because I am trusted and I trust my colleagues, who have my back in success or failure.

Our essentials are brought to life through our people's strategy.



Our people strategy translates the essentials into ambitions and actions in four ways:



At Nokia we work together to align personal, professional and business growth by providing our people with visibility, resources and support at every step of their journey. By enriching, recognizing, and rewarding individual experiences and skills, we aim to be a company where people not only work, but thrive.

In 2022, we launched a portal which harnesses the power of AI/ML to match our employees' individually profiled skills, interests, aspirations and preferences with new career opportunities and resources available at Nokia. In addition to leadership training, we established the new Technical Career Path that supports employees to advance their careers as subject matter experts without becoming a people manager. Around 261 internal coaches and around 479 mentors are available at Nokia to support our employees on their growth journey.

Focus on ESG enablement

In 2022, we focused on ESG enablement across our global organization. We introduced our first ever global mandatory ESG training which was completed by around 97% of employees by the end of the year and was available in 13 languages. We also laid the foundations of an ESG support network across our global footprint with the introduction of ESG principals. These principals spend part of their working time as an ESG point of contact and support for our teams in the field, share experiences and provide two-way engagement between corporate and regional teams. Also, an online training was introduced at both a basic level and more advanced level on ESG topics and information targeting our customer facing teams and the currently 56 ESG principals globally. Communication was also targeted at key functions within the company.

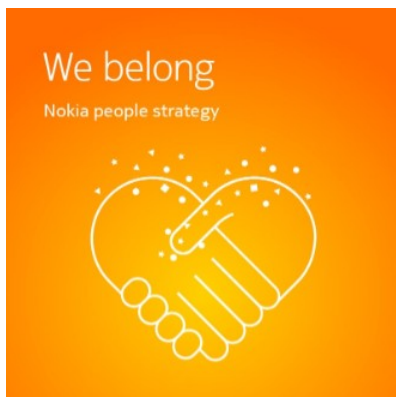


In times of change and uncertainty, it is more important than ever to lead with strong human skills that promote psychological safety and create a working environment in which all people can live our Nokia essentials. The new hybrid working environment requires connecting with employees in

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new ways, engaging through empathy, whilst retaining strategic and operational focus. To help leaders retain and develop their people in this unprecedented environment, we have implemented new initiatives in 2022, including:

- A global standard approach to onboarding new leaders with an explicit focus on preparing for management in the post-COVID working environment.
- Targeted face-to-face “Lead in Focus” sessions for critical areas of the business to support prioritization and coordination of complex technology rollouts.
- Online training modules for leaders to refresh and reflect on their leadership behaviors and skills.
- Monthly community calls allowing leaders from around the world to share best practices, tips and challenging situations to improve our collective knowledge.



We are building a culture of belonging and personal connection to the broader Nokia community. To truly act together, we must be inclusive, offering equal opportunities regardless of individual background, preferences and identity so that everyone feels valued, heard, and able to contribute.

- As part of the 2022 mandatory training for all employees, we included a Workplace Ethics and Inclusion training to further strengthen inclusive behaviors and Nokia’s speak-up culture. In addition, we launched a company wide Allyship program and established an Inclusion & Diversity community which offers volunteering opportunities and growth experiences for employees. It caters for further inclusion and diversity education and best practice sharing across Nokia.

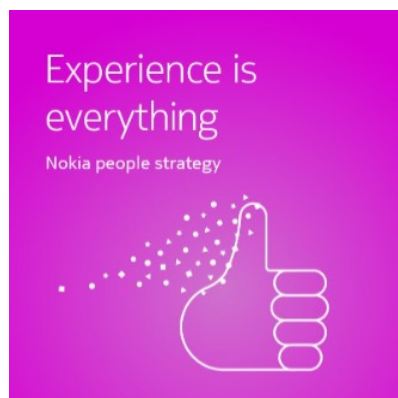
We continue actions to ensure Nokia is an inclusive place to work for people with disabilities. In 2022 we piloted four disability inclusion country projects in China, Poland, Hungary and Italy and published an eBook for managers leading people with disabilities.

We also continued to drive improvements in gender diversity by:

- Monitoring pay equity: In 2022, the end-of-year review showed a statistically barely significant unexplained pay gap. We will continue to stress and apply mitigations to keep it closed in the future.

A new global ‘New Child Leave’ policy has been implemented in 2022 to provide any Nokia employee who becomes a parent, regardless of gender, with at least 90 calendar days’ (three calendar months) paid leave and the right to return to work up to one year following the date of birth or adoption. This policy allows our people time to experience the joy of parenthood and bond with their new child free from financial stress and without the emotional pressure of returning to work too soon. The global average length of paternity leave is only approximately two weeks. This new policy encourages fathers to spend more time with their newborn child.

- Targeting 26% women in global external hiring, revising our recruitment process, and continuing training to recruiters and managers on how to avoid bias. In December 2022, women represented 26.6% of the external hires.
- Running programs in collaboration with UN Women, our customers and internally to support women’s careers.
- Increasing our talent attraction activities through:
 - forming a team of Inclusion & Diversity sourcing professionals across markets where we hire most
 - very targeted social media campaigns for diverse employee hiring
 - establishing a new Nokia Academy in Bangalore and increasing the intake of the already existing Nokia Poland Academy
 - focusing on the conversion of trainees into permanent employees.



We are shaping the Nokia environment to enable people to be empowered and productive. We strive for increased flexibility in how and where employees work, simplified policies and processes, psychological safety and the feeling of working in a united manner. We announced our new flexible working approach that was effective from 2022 and allows employees (subject to business need) to work up to three days a week remotely on average, provides greater acceptance of fully remote work, and greater flexibility in their working hours.

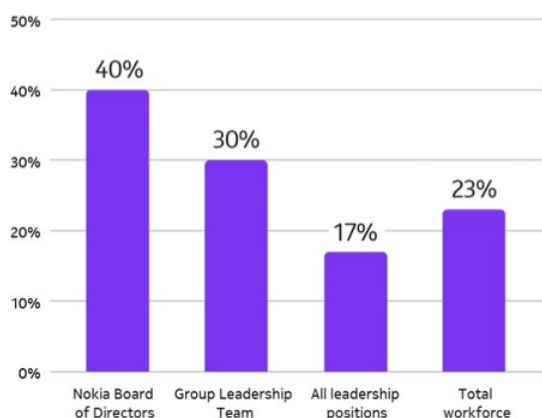
Employee demographics

The market for skilled employees in our business remains extremely competitive. Our workforce has evolved over recent years as we have introduced changes in our strategy to respond to our business targets and our activities. These changes may in the future cause disruption and fatigue among employees, which, when coupled with our employee demographics and a dependence on key resources in some areas, make a focus on skill refresh, wellbeing, inclusivity and enabling personal and professional growth imperative.

In 2022, the average number of employees was 86 896 (87 927 in 2021 and 92 039 in 2020) divided geographically as follows: Asia Pacific (21 141), China (11 427), Finland (6 753), Latin America (2 903), Middle East and Africa (3 148), North America (10 540) and other European countries (30 984).

At the end of 2022, 30% of our executive leadership positions were held by women, while the share of women in all leadership positions across Nokia was 17%. In total, women accounted for 23% of our workforce.

Share of women in our workforce in 2022



Wellbeing

Our global Life Insurance policy ensures that the loved ones of any Nokia employee who dies will receive financial support of not less than one year's gross base salary, subject to a financial cap. The local implementation of this global policy continues to progress and was almost 100% completed by end of 2022.

At Nokia, we empower employees to manage their personal health and wellbeing, feel safe talking about their mental health at work, and provide access to the support they need when they need it most. Nokia's Personal Support Service continues to provide confidential, professional support and advice on a range of emotional, practical and work-life issues, and is available to all Nokia employees and their family members. This service played a critical role in providing support to those impacted directly, or indirectly by the Russian invasion of Ukraine as well as to Nokia volunteers who worked tirelessly to support refugees from Ukraine.

Our global mental health and wellbeing training series continued in 2022 with 23 webinars covering a wide range of topics from ergonomics and movement to sleep and burnout. Over 11 000 employees engaged with the content in these sessions, either live or on-demand. Regional trainings are available in local languages. Over 10 000 employees registered to participate in the nine-week annual Nokia Sports Festival which emphasizes the importance of movement to enhance physical and mental wellbeing. We also launched an employee-led resource group, ShareToCare, to normalize conversations around mental health by voluntarily sharing personal experiences.

Health, safety and labor conditions

Our Code of Conduct is the basis for labor conditions, enhanced by a full set of global human resources policies and procedures that enable fair employment. We adhere to the International Labor Organization (ILO) Declaration on Fundamental Principles and Rights at Work, and we meet, or where possible exceed, the requirements of labor laws and regulations wherever we have operations. We work hard to ensure decent working conditions and fair employment, recognizing both international and local laws and guidelines. Our health and safety management system is the basis for our overall program and an integral part of how we manage health and safety.

The management system is certified with the internationally recognized ISO 45001. The certification is provided by a third party, Bureau Veritas, and the share of our employees covered by the certification at the end of 2022 was over 84%.

We implement training, analysis, assessments and consequence management to address job-related health and safety risks. We run a wide range of programs targeted at constantly improving our health and safety performance, while also encouraging employees and contractors to report near misses and dangerous incidents.

We see the highest risk exposure to health and safety in the delivery of field work, which is predominantly delivered by our contractors through tasks such as working at height, driving for work and electrical installation and maintenance. Consequently, we have set stringent key performance indicators related to the supplier's ability to deliver safely, which is evaluated by our Health and Safety Maturity Assessment process.

Our key standards Working at Height, Rigging & Lifting, and Driving and Electrical are implemented with non-negotiables for effective controls to manage risk on a global scale in all markets. Incident management and reporting and investigation programs encourage all employees and contractors working on our behalf to report all incidents including near misses and high potential incidents.

Our assurance and governance programs have built in checkpoints to measure effectiveness. We have agreed metrics and key performance indicators designed into all levels of our programs and business processes to assure and manage risk in critical areas such as supplier qualification and project management where high-risk activities are delivered. Market operational reviews and internal and external audits provide the visibility and accountability needed to improve performance and reduce risk. In addition, regular reporting, communication of recovery plans and action management are in place to ensure effective program management.

By the end of 2022, 99.1% of suppliers delivering high-risk activity had been assessed using our H&S Maturity Assessment Process and 98.3% of the assessed suppliers met H&S compliant supplier status. We also carried out implementation assessments on 99.4% of all high-risk projects. 96.6% of those projects were found to meet our minimum non-negotiable requirements.

Shares and shareholders

Share details

Shares and share capital

Nokia has one class of shares. Each Nokia share entitles the holder to one vote at general meetings of Nokia.

At 31 December 2022, the share capital of Nokia Corporation equaled EUR 245 896 461.96 and the total number of shares issued was 5 632 297 576. At 31 December 2022, the total number of shares included 45 281 539 shares owned by Group companies representing approximately 0.8% of the total number of shares and the total voting rights.

In 2022, under the authorization granted to the Board of Directors by the Annual General Meeting, the Parent Company issued 20 800 000 new shares without consideration to itself to fulfill the company's obligation under the Nokia Equity Programs.

In 2022, under the authorization granted to the Board of Directors by the Annual General Meeting, the Parent Company issued 15 986 016 treasury shares to employees, including certain members of the Group Leadership Team, as settlement under Parent Company equity-based incentive plans and the employee share purchase plan. The shares were issued without consideration and in accordance with the rules of the plans.

Information on the authorizations held by the Board of Directors in 2022 to issue shares and special rights entitling to shares, to transfer shares and repurchase own shares, as well as information on related party transactions, the shareholders, stock options, shareholders' equity per share, dividend yield, price per earnings ratio, share prices, market capitalization, share turnover and average number of shares is available in this section "Shares and shareholders" and additionally in the "Corporate governance—Compensation" section, and in Notes 18, Equity and 31, Related party transactions, of the consolidated financial statements.

In December 2022, the Board of Directors decided to cancel 63 963 583 Nokia shares held by the Company and repurchased under the buyback program initiated in the first quarter of 2022. The cancellation did not affect the Company's share capital nor total equity.

The Board of Directors held at 31 December 2022 a total of 969 511 shares and ADSs in Nokia, which represented approximately 0.02% of our total shares and voting rights excluding shares held by the Nokia Group. The President and CEO owned at 31 December 2022 a total of 1 289 304 shares.

There were no public takeover offers by third parties for Nokia's shares or by Nokia for other companies' shares during the 2022 and 2021 fiscal years.

Nokia does not have minimum or maximum share capital or a par value of a share.

31 December	2022	2021	2020	2019	2018
Share capital, EURm	246	246	246	246	246
Shares, (000s)	5 632 298	5 675 461	5 653 886	5 640 536	5 635 945
Shares held by the Group, (000s)	45 282	40 468	36 390	34 955	42 783
Number of shares excluding shares held by the Group, (000s)	5 587 016	5 634 993	5 617 496	5 605 581	5 593 162
Average number of shares excluding shares held by the Group during the year					
Basic, (000s) ⁽¹⁾	5 614 182	5 630 025	5 612 418	5 599 912	5 588 020
Diluted, (000s) ⁽¹⁾	5 670 020	5 684 235	5 612 418	5 626 375	5 588 020
Number of registered shareholders ⁽²⁾	238 359	233 844	246 886	248 526	243 409

(1) Used in calculation of earnings per share for profit or loss for the year attributable to equity holders of the parent.

(2) Each account operator is included in the figure as only one registered shareholder.

Key ratios

For the year ended 31 December, Continuing operations	2022	2021	2020	2019	2018
Earnings per share, basic, EUR	0.75	0.29	(0.45)	0.00	(0.10)
Earnings per share, diluted, EUR	0.74	0.29	(0.45)	0.00	(0.10)
P/E ratio	5.77	19.22	neg.	—	neg.
Proposed dividend per share, EUR ⁽¹⁾⁽²⁾	0.12	0.08	0.00	0.00	0.20
Total dividends, EURm ⁽¹⁾⁽³⁾	676	449	—	—	560
Payout ratio ⁽¹⁾	0.16	0.28	—	—	neg.
Dividend yield % ⁽¹⁾	2.77	1.44	—	—	3.98
31 December	2022	2021	2020	2019	2018
Shareholders' equity per share, EUR	3.82	3.08	2.22	2.73	2.73
Share price ⁽⁴⁾	4.33	5.57	3.15	3.30	5.03
Market capitalization, EURm	24 192	31 409	17 701	18 476	28 134

(1) The Board of Directors proposes to the Annual General Meeting to be authorized to decide in its discretion on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity.

(2) In 2019, Nokia's Annual General Meeting resolved to authorize the Board of Directors to resolve on the distribution of an aggregate maximum of EUR 0.20 per share as dividend for the financial year 2018 in four quarterly installments. Finally, the Board of Directors resolved on the distribution of two quarterly installments totaling EUR 0.10 per share.

(3) In 2022, dividends paid is calculated based on the proposed Annual General Meeting authorization to the Board of maximum distribution of EUR 0.12 per share for the financial year 2022, and the total number of shares on the date of issuing the financial statements for 2022. On the date of issuing the financial statements for 2022 the total number of Nokia shares is 5 632 297 576. Comparative amounts represent the actual total distribution to equity holders of the parent for the year presented.

(4) Closing Nokia share price at year-end on Nasdaq Helsinki.

Share turnover

For the year ended 31 December

	2022	2021	2020	2019	2018
Number of shares traded during the year (000s) ⁽¹⁾	10 294 615	16 560 334	13 903 762	11 003 630	8 960 687
Average number of shares excluding shares held by the Group during the year (000s)	5 614 182	5 630 025	5 612 418	5 599 912	5 588 020
Share turnover %	183	294	248	196	160

(1) Source: Nasdaq Helsinki, the NYSE composite tape and Euronext Paris.

The principal trading markets for the shares are Nasdaq Helsinki and Euronext Paris, in the form of shares, and the NYSE, in the form of ADSs.

Share price development

Annual data	Nasdaq Helsinki			New York Stock Exchange			Euronext Paris		
	High	Low	Value	High	Low	Value	High	Low	Value
	EUR			USD			EUR		
2022 Full year High/Low	5.77	4.12		6.34	4.08		5.76	4.12	
2022 Full year Average (Volume-weighted)			4.75			4.99			4.83
Year-end value 31 December 2022			4.33			4.64			4.34
Year-end value 31 December 2021			5.57			6.22			5.57
Change from 31 December 2021 to 31 December 2022			(22.3)%			(25.4)%			(22.1)%

Stock option exercises

Since 2019, Nokia has not administered any global stock option plans.

Dividend and share buybacks

The dividend to shareholders is Nokia's principal method of distributing earnings to shareholders. The dividend policy was updated at the Capital Markets Day in March 2021 to be "We target recurring, stable and over time growing ordinary dividend payments, taking into account the previous year's earnings as well as the company's financial position and business outlook".

The Board proposes to the Annual General Meeting 2023 to be authorized to decide, in its discretion, on the distribution of an aggregate maximum of EUR 0.12 per share as dividend and/or as assets from the reserve for invested unrestricted equity. The authorization would be used to distribute dividend and/or assets from the reserve for invested unrestricted equity in four installments during the authorization period, in connection with the quarterly results, unless the Board of Directors decides otherwise for a justified reason. The proposed total authorization for distribution of dividend and/or assets from the reserve for invested unrestricted equity is in line with the Company's dividend policy. The authorization would be valid until the opening of the next Annual General Meeting. The Board would make separate resolutions on the amount and timing of each distribution of dividend and/or assets from the reserve for invested unrestricted equity.

In 2020 and 2021, Nokia generated strong cash flow which has significantly improved the cash position of the company. To manage the company's capital structure, Nokia's Board of Directors initiated a share buyback program under the authorizations from the Annual General Meetings 2021 and 2022 to repurchase shares to return up to EUR 600 million of cash to shareholders in tranches over a period of two years. The first phase of the share buyback program with a maximum aggregate purchase price of EUR 300 million started in February 2022 and ended in November 2022. The second EUR 300 million phase of the share buyback program started in January 2023 and it will end at the latest by 21 December 2023.

We distribute distributable funds, if any, within the limits set by the Finnish Companies Act as defined below. We make and calculate the distribution, if any, in the form of cash dividends, assets from the reserve for invested unrestricted equity, share buybacks, or in some other form, or a combination of these. There is no specific formula by which the amount of a distribution is determined, although some limits set by law are discussed below. The timing and amount of future distributions of retained earnings and/or assets from the reserve for invested unrestricted equity, if any, will depend on our future results and financial conditions.

Under the Finnish Companies Act, we may distribute retained earnings and/or assets from the reserve for invested unrestricted equity on our shares only upon a shareholders' resolution and subject to limited exceptions in the amount proposed by the Board. The amount of any distribution is limited to the amount of distributable earnings of the Parent Company pursuant to the last audited financial statements approved by our shareholders, taking into account the material changes in the financial situation of the Parent Company after the end of the last financial period and a statutory requirement that the distribution of earnings must not result in insolvency of the Parent Company. Subject to exceptions relating to the right of minority shareholders to request a certain minimum distribution, the distribution may not exceed the amount proposed by the Board of Directors.

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Purchases of equity securities by the Company and affiliated purchasers

The table below presents additional information on the purchases of treasury shares in 2022:

Period	Total number of shares purchased	Average price paid per share, EUR	Total number of shares purchased as part of publicly announced plans or programs	Maximum value of shares that may yet be purchased under the plans or programs, EUR
January	0	-	0	300 000 000
February	3 329 808	4.91	3 329 808	283 659 670
March	7 133 000	4.71	7 133 000	250 098 525
April	5 349 700	4.93	5 349 700	223 733 533
May	7 028 300	4.70	7 028 300	190 704 228
June	7 494 800	4.57	7 494 800	156 482 445
July	6 747 000	4.64	6 747 000	125 160 611
August	5 564 840	5.02	5 564 840	97 215 458
September	7 623 200	4.68	7 623 200	61 564 055
October	9 275 500	4.51	9 275 500	19 741 514
November	4 417 435	4.47	4 417 435	-
December	0	-	0	300 000 000 ⁽¹⁾
Total	63 963 583	4.69	63 963 583	

⁽¹⁾ In December 2022, the Board decided to launch the second EUR 300 million phase of the share buyback program pursuant to an authorization from the Annual General Meeting 2022. The repurchases started in January 2023.

Shareholders

At 31 December 2022, shareholders registered in Finland represented approximately 23% and shareholders registered in the name of a nominee represented approximately 77% of the total number of shares of Nokia Corporation. The number of directly registered shareholders was 238 359 at 31 December 2022. Each account operator (12) is included in this figure as only one registered shareholder.

Largest shareholders registered in Finland at 31 December 2022⁽¹⁾

Shareholder	Total number of shares 000s	% of all shares	% of all voting rights
Solidium Oy	301 000	5.34	5.34
Keskinäinen Työeläkevakuutusyhtiö Varma	75 236	1.34	1.34
Keskinäinen Eläkevakuutusyhtiö Ilmarinen	68 595	1.22	1.22
Keskinäinen Työeläkevakuutusyhtiö Elo	33 690	0.60	0.60
Valtion Eläkerahasto	29 000	0.51	0.51
OP-Suomi -Sijoitusrahasto	17 865	0.32	0.32
Oy Lival Ab	17 020	0.30	0.30
Svenska Litteratursällskapet i Finland r.f.	15 217	0.27	0.27
Nordea Pro Finland Fund	10 710	0.19	0.19
Danske Invest Finnish Equity Fund	9 130	0.16	0.16

⁽¹⁾ Excluding nominee registered shares and shares owned by Nokia Corporation. Nokia Corporation owned 33 822 878 shares at 31 December 2022.

Breakdown of share ownership at 31 December 2022⁽¹⁾

By number of shares owned	Number of shareholders	% of shareholders	Total number of shares	% of all shares
1–100	62 259	26.12	3 050 629	0.05
101–1 000	109 230	45.83	48 557 985	0.86
1 001–10 000	58 824	24.68	183 833 261	3.26
10 001–100 000	7 547	3.17	186 194 111	3.31
100 001–500 000	393	0.17	75 445 465	1.34
500 001–1 000 000	43	0.02	30 630 857	0.54
1 000 001–5 000 000	40	0.02	105 494 319	1.87
Over 5 000 000	23	0.01	4 999 090 949	88.76
Total	238 359	100.00	5 632 297 576	100.00

⁽¹⁾ The breakdown covers only shareholders registered in Finland, and each account operator (12) is included in the number of shareholders as only one registered shareholder. As a result, the breakdown is not illustrative of the entire shareholder base of Nokia.

By nationality	% of shares
Non-Finnish shareholders	77.49
Finnish shareholders	22.51
Total	100.00

By shareholder category (Finnish shareholders)	% of shares
Corporations	2.39
Households	7.44
Financial and insurance institutions	2.15
Non-profit organizations	1.28
Governmental bodies (incl. pension insurance companies)	9.25
Total	22.51

At 31 December 2022, a total of 866 842 784 ADSs (equivalent to the same number of shares or approximately 15.4% of the total shares) were outstanding and held of record by 103 448 registered holders in the United States. We are aware that many ADSs are held of record by brokers and other nominees, and accordingly the above number of holders is not necessarily representative of the actual number of persons who are

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beneficial holders of ADSs or the number of ADSs beneficially held by such persons. Based on information available from Broadridge Financial Solutions, Inc., the number of beneficial owners of ADSs at 31 December 2022 was 819 411.

Based on information known to us as of 1 February 2023, at 31 December 2022, BlackRock, Inc. beneficially owned 347 358 118 Nokia shares, which at that time corresponded to approximately 6.2% of the total number of shares and voting rights of Nokia.

To the best of our knowledge, Nokia is not directly or indirectly owned or controlled by any other corporation or any government, and there are no arrangements that may result in a change of control of Nokia.

Shares and stock options owned by the members of the Board and the Nokia Group Leadership Team

At 31 December 2022, the members of our Board and the Group Leadership Team held a total of 4 581 561 shares and ADSs in Nokia, which represented approximately 0.08% of our shares and total voting rights excluding shares held by the Nokia Group.

Offer and listing details

Our capital consists of shares traded on Nasdaq Helsinki under the symbol "NOKIA" and Euronext Paris under the symbol "NOKIA". Our ADSs, each representing one of our shares, are traded on the NYSE under the symbol "NOK". The ADSs are evidenced by American Depositary Receipts (ADRs) issued by Citibank, N.A.

Articles of Association

Articles of Association

Amendment of our Articles of Association requires a resolution of the general meeting of shareholders, supported by two-thirds of the votes cast and two-thirds of the shares represented at the meeting.

Registration

Nokia Corporation is organized under the laws of the Republic of Finland and registered in the Finnish Trade Register under the business identity code 0112038-9. Under its current Articles of Association, Nokia's corporate purpose is to research, develop, manufacture, market, sell and deliver products, software and services in a wide range of consumer and business-to-business markets. These products, software and services relate to, among others, network infrastructure for telecommunication operators and other enterprises, the internet of things, human health and wellbeing, multi-media, big data and analytics, mobile devices and consumer wearables and other electronics. The company may also create, acquire and license intellectual property and software as well as engage in other industrial and commercial operations, including securities trading and other investment activities. The company may carry on its business operations directly, through subsidiary companies, affiliate companies and joint ventures.

Directors' voting powers

Under Finnish law, resolutions of the Board shall be made by a majority vote. A director shall refrain from taking any part in the consideration of an agreement between the director and the company or third party, or any other issue that may provide any material benefit to him or her, which may be contradictory to the interests of the company. Under Finnish law, there is no age limit requirement for directors, and there are no requirements under Finnish law that a director must own a minimum number of shares in order to qualify to act as a director. However, in accordance with the current company policy, approximately 40% of the annual fee payable to the Board members is paid in Nokia shares purchased from the market or alternatively by using treasury shares held by Nokia, and the directors shall retain until the end of their directorship such number of shares that corresponds to the number of shares they have received as Board remuneration during their first three years of service (the net amount received after deducting those shares used for offsetting any costs relating to the acquisition of the shares, including taxes).

Share rights, preferences and restrictions

Each share confers the right to one vote at general meetings. According to Finnish law, a company generally must hold an Annual General Meeting called by the Board within six months from the end of the financial year. Additionally, the Board is obliged to call an Extraordinary General Meeting, whenever such meeting is deemed necessary, or at the request of the auditor or shareholders representing a minimum of one-tenth of all outstanding shares. Under our Articles of Association, the Board is elected at least annually at the Annual General Meeting of shareholders for a term ending at the end of the next Annual General Meeting.

Under Finnish law, shareholders may attend and vote at general meetings in person or by proxy. It is not customary in Finland for a company to issue forms of proxy to its shareholders. Accordingly, Nokia does not do so. However, registered holders and beneficial owners of ADSs are issued forms of proxy by the Depositary.

To attend and vote at a general meeting, a shareholder must be registered in the register of shareholders in the Finnish book-entry system on or prior to the record date set forth in the notice of the general meeting. A registered holder or a beneficial owner of the ADSs, like other beneficial owners whose shares are registered in the company's register of shareholders in the name of a nominee, may vote with their shares provided that they arrange to have their name entered in the temporary register of shareholders for the general meeting.

The record date is the eighth business day preceding the meeting. To be entered in the temporary register of shareholders for the general meeting, a holder of ADSs must provide the Depositary, or have his broker or other custodian provide the Depositary, on or before the voting deadline, as defined in the proxy material issued by the Depositary, a proxy with the following information: the name, address, and social security number or another corresponding personal identification number of the holder of the ADSs, the number of shares to be voted by the holder of the ADSs and the voting instructions. The register of shareholders as of the record date of each general meeting is public until the end of the respective meeting. Other nominee registered shareholders can attend and vote at the general meetings by instructing their broker or other custodian to register the shareholder in Nokia's temporary register of shareholders and give the voting instructions in accordance with the broker's or custodian's instructions.

By completing and returning the form of proxy provided by the Depositary, a holder of ADSs also authorizes the Depositary to give notice to us, required by our Articles of Association, of the holder's intention to attend the general meeting.

The rights of shareholders are related to the shares as set forth in the Finnish Companies Act and our Articles of Association. Neither Finnish law nor our Articles of Association sets limitations on the rights to own Nokia securities, including the rights of foreign shareholders to hold or exercise voting rights in the said securities. Amendment of the Articles of Association requires a decision of the general meeting of shareholders, supported by two-thirds of the votes cast and two-thirds of the shares represented at the meeting.

Each of our shares confers equal rights to share in the distribution of the company's funds. Under Finnish law, dividend entitlement lapses after three years if a dividend remains unclaimed for that period, in which case the unclaimed dividend will be recognized as income by Nokia.

Disclosure of shareholder ownership or voting power

According to the Finnish Securities Market Act, a shareholder shall disclose his or her ownership or voting power to the company and the Finnish Financial Supervisory Authority when the ownership or voting power reaches, exceeds or falls below 5, 10, 15, 20, 25, 30, 50 or 90% of all the shares or the voting rights. The term "ownership" includes ownership by the shareholder, as well as selected related parties, and calculating the ownership or voting power covers agreements or other arrangements, which when concluded would cause the proportion of voting rights or number of shares to reach, exceed or fall below the aforementioned limits. Upon receiving such notice, the company shall disclose it by a stock exchange release without undue delay.

Purchase obligation

Our Articles of Association require a shareholder that holds one-third or one-half of all of our shares to purchase the shares of all other shareholders that so request. A shareholder who becomes subject to the purchase obligation is also obligated to purchase any subscription rights, stock options or convertible bonds issued by the company if so requested by the holder. The purchase price of the shares under our Articles of Association is the higher of: (a) the weighted average trading price of the shares on Nasdaq Helsinki during the ten business days prior to the day on which we have been notified by the purchaser that its holding has reached or exceeded the threshold referred to above or, in the absence of such notification or its failure to arrive within the specified period, the day on which our Board otherwise becomes aware of this; or (b) the average price, weighted by the number of shares, which the purchaser has paid for the shares it has acquired during the last 12 months preceding the date referred to in (a).

Under the Finnish Securities Market Act, a shareholder whose voting power exceeds 30% or 50% of the total voting rights in a company shall, within one month, offer to purchase the remaining shares of the company, as well as any other rights entitling to the shares issued by the company, such as subscription rights, convertible bonds or stock options issued by the company. The purchase price shall be the market price of the securities in question. Subject to certain exceptions, the market price is determined on the basis of the highest price paid for the security during the preceding six months by the shareholder or any party in close connection to the shareholder. Subject to certain exceptions, if the shareholder or any related party has not during the six months preceding the offer acquired any securities that are the target for the offer, the market price is determined based on the average of the prices paid for the security in public trading during the preceding three months weighted by the volume of trade.

Under the Finnish Companies Act, a shareholder whose holding exceeds nine-tenths of the total number of shares or voting rights in Nokia has both the right and, upon a request from the minority shareholders, the obligation to purchase all the shares of the minority shareholders for the then current market price. The market price is determined, among other things, on the basis of the recent market price of the shares. The purchase procedure under the Finnish Companies Act differs, and the purchase price may differ, from the purchase procedure and price under the Finnish Securities Market Act, as discussed above. However, if the threshold of nine-tenths has been exceeded through either a mandatory or a voluntary public offer pursuant to the Finnish Securities Market Act, the market price under the Finnish Companies Act is deemed to be the price offered in the public offer, unless there are specific reasons to deviate from it.

Pre-emptive rights

In connection with any offering of shares, the existing shareholders have a pre-emptive right to subscribe for shares offered in proportion to the amount of shares in their possession. However, a general meeting of shareholders may vote, by a majority of two-thirds of the votes cast and two-thirds of the shares represented at the meeting, to waive this pre-emptive right provided that, from the company's perspective, weighty financial grounds exist.

Monitoring of Foreign Corporate Acquisitions

Under the Finnish Act on the Monitoring of Foreign Corporate Acquisitions (2012/172 as amended), a notification to the Ministry of Economic Affairs and Employment is required for a non-resident of Finland, directly or indirectly, when acquiring one-tenth or more of the voting power or corresponding factual influence in a company. The Ministry of Economic Affairs and Employment has to confirm the acquisition unless the acquisition would jeopardize important national interests, in which case the matter is referred to the Council of State. If the company in question is operating in the defense sector, an approval by the Ministry of Economic Affairs and Employment is required before the acquisition is made. These requirements are not applicable if, for instance, the voting power is acquired in a share issue that is proportional to the holder's ownership of the shares. Moreover, the requirements do not apply to residents of countries in the European Economic Area or EFTA countries, except where at least one tenth of shares or other controlling right in such resident are held by a party not resident in the European Economic Area or EFTA.

Risk factors

Set forth below is a description of risk factors that could affect our business. Shareholders and potential investors should carefully review the following risk factors, in addition to other information contained in this report. The risk factors described below should not be construed as exhaustive. There may be additional risks that are unknown to us, and other risks currently believed to be immaterial that could turn out to be material.

These risks, either individually or collectively, could adversely affect our business, competitiveness, market share, sales, costs, expenses, results of operations, profitability, financial condition, liquidity, reputation, brand and share price. Unless otherwise indicated or the context otherwise requires, references in these risk factors to "Nokia", the "Nokia Group", "Group", "we", "us" and "our" mean Nokia's consolidated operating segments. Certain risks or events may be more prevalent with respect to the Group or a certain business group, business or part of the Group.

In evaluating the risks, one should not rely exclusively on the bullets in the below summary but read the full risk factor discussion. This report also contains forward-looking statements that involve risks and uncertainties presented in "Forward-looking statements" above.

Risk factors summary

Cost and performance remain the top priorities for our customers. Our capability to compete in the top-two-vendors field, as a trusted partner for critical networks, is dependent on multiple external and internal factors, partially outside our control, including such as:

Risks related to our strategy and its execution

- Our ability to become and remain a leading provider of technology, software and services in the industries and markets in which we operate;
- Sustained traffic growth over customers' networks, growing use cases and low-latency services as a driver for the demand for our products;
- Reaching technology limits in key technologies which might change demand pattern for our products and competitive dynamics;
- Trends, such as cloudification, open RAN/openness, virtualization and disaggregation with potential impact on our portfolio of products and services, competitive landscape, business models and our margin profile;
- The degree our investments, including venture funds, result in technologies, products or services that achieve or retain broad or timely market acceptance, answer to the expanding needs or preferences of our customers or consumers, or in break-through innovations, research assets, digitalization and intellectual property that we could otherwise utilize for value creation;
- Our ability and success in acquiring or divesting businesses and technologies, integrating acquisitions, entering into licensing arrangements, and in forming and managing joint ventures or partnerships;
- Our success in continuing to improve our operations and efficiencies, and executing our business plans; and
- Our ability to meet our sustainability targets, including with respect to our greenhouse gas emission commitments, and to comply with stakeholder expectations regarding sustainability activities and disclosures.

Surrounding economic, financial and competitive environment

- General economic and financial market conditions, such as accelerating inflation, increased global macroeconomic uncertainty, major currency fluctuations, higher interest rates and financing costs, and other developments in the economies and industries where we, our customers and partners/suppliers operate, including the current situation involving Russia and Ukraine that has ignited a threat of energy crises and recession particularly in Europe;
- Duration of the COVID-19 outbreak, or appearance of other viral pandemic, disruptiveness of the related measures to contain the virus and other prolonged impacts of the pandemic;
- The cyclical nature of the markets in which we operate, competitor behavior, technological changes, customer consolidation, customer purchase and spending behavior, deployments and rollout timing;
- Accelerating inflation and our ability to pass increased costs to our pricing;
- Price erosion largely driven by competition challenging the connectivity business models of our customers;
- Our dependency on a limited number of customers and large multi-year agreements;
- Competitiveness of, or developments regarding, pricing and agreement terms we offer, including developments with respect to customer financing or extended payment terms or credit lines that we provide our customers; and
- Willingness of banks or other institutions to purchase our receivables.

Our competitiveness

- Our ability to adapt to changing business models, technological changes and to meet new competition;
- Investing in new competitive high-quality products, services, upgrades and technologies that have accurately anticipated the technological, regulatory and market trends;
- Our success in the development of new technologies and services, their rollout and commercialization in a timely manner;
- Our capabilities to manage end-to-end costs related to our portfolio of products and services;
- Severity of inefficiencies, incidents, malfunctions or disruptions of our information technology systems and processes or disruptions of services relying on our or third-party IT;

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- Actual or perceived security or privacy breaches, as well as defects, errors or vulnerabilities in our technology and that of third-party providers;
- Our manufacturing, service creation, delivery, logistics or supply chain to operate without significant interruptions or shortages, including the impacts of COVID-19, Russian invasion of Ukraine, other geopolitical tensions, European energy crisis and the overall disruption and continuing uncertainty in the global supply chain;
- Performance capabilities of our partners, suppliers and their high standards to meet product quality, health, safety or security requirements or comply with other regulations or local laws, such as environmental or labor laws;
- Natural or man-made disasters, military actions, wars, labor unrest, civil unrest or health crises impacting our service delivery or production sites or the production sites of our suppliers, which are geographically concentrated;
- Our ability to retain, develop, reskill and recruit appropriately skilled employees in the right activities and locations; and
- Success in identifying and implementing the appropriate measures to improve cost-efficiency, maintaining achieved efficiency level and managing the inflationary pressures regarding salary and other costs in order to continue investments in R&D and future capabilities, including 5G-Advanced and 6G, cloud, security, automation/digitalization and development of new standard essential patents.

[Intellectual property rights, technology and brand licensing](#)

- Our ability to create new relevant technologies, products and services through our R&D, as well as our ability to protect our innovations and to maintain the strength of our intellectual property portfolio;
- Our ability to monetize our intellectual property e.g., due to market, regulatory and other developments, or court rulings in intellectual property-related litigation and other disputes;
- Uncertainty relating to the evolving global regulatory and standardization landscape relating to intellectual property;
- Developments in the concentrated smartphone market, the source of a significant portion of our patent licensing income;
- Success and profitability of technology licensing, brand licensing and other business ventures, including venture fund investments where the valuation and proceeds of our venture fund investments may fluctuate;
- Our ability to renew existing license agreements and conclude new license agreements regarding our intellectual property that we license to others on acceptable commercial terms, and the timing, cost, and potential need for litigation to achieve such renewals and new license agreements;
- Claims that we have allegedly infringed third parties' IPR; and
- Our ability to renew or finalize licenses regarding technologies that are licensed to us on acceptable commercial terms.

[Geopolitical, legal, regulatory and compliance environment](#)

- Direct and indirect regulation and political developments affecting trade, taxation, national security, competition law, export controls and sanctions, cyber security, supply chains, environmental, social and governance (ESG) topics (including related reporting) and anti-corruption;
- Developments related to the Russian invasion of Ukraine, including impact of coordinated economic and financial sanctions packages and of our decision to discontinue our operations in Russia and Belarus;
- Changes in regulations or in their application, and/or emerging new regulation applicable to current or new technologies, products or telecommunication and technology sectors in general;
- Our products, services and operations meeting all relevant quality, health, safety or security standards and other recommendations and regulatory requirements globally;
- Compliance with laws and regulations relating to privacy, data protection, and the protection or transfer of personal data;
- Our ability to maintain an effective system of governance and compliance processes, disclosure controls and internal control over financial reporting and influence those of third parties whose performance we may be held liable for;
- The degree of control and level of influence in the joint ventures where Nokia is the minority partner and other affiliated companies where Nokia does not have direct management control, or which are not fully integrated into its operational infrastructure; and
- Damage caused to existing undersea infrastructure during installation or maintenance of undersea telecommunications cable networks.

[Financial and tax-related uncertainties](#)

- Complex tax laws and rules, including any changes in the aforesaid, as well as diverse tax authority practices and interpretations;
- Our ability to utilize our tax attributes and deferred tax assets;
- Access to sources of funding on favorable terms or at all;
- Our ability to maintain our credit ratings;
- Exchange rate fluctuations impacting our net sales, costs and results of operations, as well as the US dollar value of our dividends and market price of our ADSs;
- Our pension and other post-employment benefit obligations and the potential need for increased funding; and
- Recoverability of the carrying amount of our goodwill, which could result in significant impairment charges.

[Ownership of our shares](#)

- Uncertainty of the amount of dividend and/or repayment of capital and other profit distributions such as share buybacks to shareholders for each financial period;
- Volatility of the trading price of our shares and ADSs, including as a result of factors outside our control; and

- Potential requirement of non-Finnish shareholders to provide detailed information in order to obtain advantageous withholding tax treatment for dividends.

Full risk factor discussion

Risks related to our strategy and its execution

We may be unable to successfully implement our strategic plans, sustain or improve the operational and financial performance of our business groups, correctly identify or successfully pursue business opportunities, correctly anticipate or successfully mitigate technological disruptions that have adverse effects on our business, or otherwise grow our business.

Our success is dependent on our ability to become and remain a leading provider of technology, software and services in the industries and markets in which we operate. However, there can be no assurance that we will correctly identify trends, opportunities or threats to pursue or mitigate to be able to achieve the goals or targets we have set. For example, our plans assume sustained growth in traffic over our customers' networks. For this to happen, video streaming needs to continue to grow significantly or new high-data use cases (e.g., Virtual Reality/Augmented Reality) need to be developed and drive high concurrency traffic. We also assume growing number of use cases and demand for low latency services. Should these not materialize, demand for our products and services might be negatively affected.

Our path to continued technology leadership lies in long term research and development to drive innovation across a comprehensive portfolio of network equipment, software, services and licensing. We are investing, for instance, in 5G-Advanced and 6G research, security and development of new standard-essential patents. The R&D of innovative products, services and technologies is a complex and uncertain process and there can be no assurance that our investments will result in technologies, products or services that achieve or retain broad or timely market acceptance, answer to the expanding needs or preferences of our customers or consumers, or breakthrough innovations that we could otherwise utilize for value creation. As an example, while we believe that the progress of cloudification and open RAN/openness creates an opportunity for us to differentiate with our products and to serve our customers better, it may lead to entry of new competitors with different business models to build multi-vendor RAN networks. The virtualization and cloudification of core and radio networks and the convergence of IT and telecommunications may lower barriers of entry for IT and webscale companies in the traditional telecommunications industry or they may build up tight strategic partnerships with our traditional competitors or our communication service provider customers. The enhanced competition might result in increased price competition and negatively affect our margins. Virtualization and disaggregation might also affect other parts of our portfolio and lead to changes in competitive landscape, business models, and margin profile. Also, reaching certain technology limits, e.g., in Optical or in spectral efficiency gains in 6G, might adversely change the demand pattern and competitive dynamics for our products and services. We see the network as the key enabler of metaverse opportunities, but the network capabilities will need to evolve to fulfill the needs anticipated.

We implement our strategic plans, for instance, by entering into licensing arrangements, partnering with third parties and may engage in possible transactions, such as acquisitions, mergers, joint ventures or minority investments that could complement or improve our existing operations or technologies and enable us to grow our business. We also engage to divestitures of our existing businesses or operations in order to sharpen our business focus. Additionally, we may make investments in certain investment funds, including NGP Capital, that invest in other companies. There can be no assurance that our efforts to continuously improve our operations and efficiencies will or continue to generate the expected results or improvements or that we will achieve intended targets or financial objectives related to such efforts. For instance, the underlying rationale or the business case in terms of profits, revenue, strategic impact or otherwise justifying the creation or continuation of the arrangement may not be realized. We may also encounter issues or inefficiencies related to our organizational and operational structure, including being unable to successfully implement the business plans. Also, the planned transactions may not ultimately be completed on favorable terms or at all, or transactions may result in liabilities. Transactions may result in claims between the parties such as indemnification or breach of contract claims, which can consume time and management attention, and the outcome of any claims related to transactions may be difficult to predict. Furthermore, our initial assumptions may be incorrect in evaluating a transaction. Therefore, we may be exposed to unknown, larger or contingent liabilities of acquired businesses, such as those related to contractual obligations, taxes, pensions, environmental liabilities, disputes and compliance matters. As previously disclosed, we were made aware of certain practices relating to compliance practices at the former Alcatel-Lucent business that have raised concerns. We voluntarily reported the matter to the relevant regulatory authorities and we continue to cooperate with them. We have seen no evidence that would suggest that criminal penalties would apply in this case, and we believe it is highly likely that any penalties that might apply would be limited and immaterial.

Performance failures of our partners, as well as failures to agree to partnering arrangements with third parties could adversely affect us.

We are increasingly collaborating and partnering with third parties to develop technologies, products and services, as well as seeking new revenue streams through partnering arrangements. We also depend on partners in our efforts to monetize our brands and technologies, including those of Nokia and Nokia Bell Labs, and we have outsourced various functions to third parties and are relying on them to provide certain services to us. Furthermore, according to our technology vision for 2030, the opportunities of the metaverse will be realized by a multi-party value ecosystem developed around collaboration, co-innovation and partnering. Although the objective of the collaborative and partnering arrangements is a mutually beneficial outcome for each party, our ability to introduce and provide technologies, products and services in a timely manner and so that those are commercially viable and meet our, our customers' and consumers' quality, safety, security and other standards could be hampered by performance or other failures of our partners or the companies we collaborate with. For instance, if a partner acts inconsistently with our ethical, sustainability, compliance, brand, or quality standards, this can negatively affect our reputation, the value of our brand, and the business outcome of our partnerships. Furthermore, if we fail altogether to achieve the collaboration or partnering arrangements needed to succeed, we may be unable to bring our products, services or technologies to market successfully or in a timely manner. It is also possible that the parties we currently collaborate with, turn into our competitors.

In many areas, including IT, finance and human resources-related arrangements, a failure to maintain an efficient relationship with the selected partner may lead to ongoing operational problems or even to severe business disruptions, and the availability of the processes and services upon which we rely may be interrupted. Performance problems may result in missed reporting deadlines, internal controls challenges, financial losses, missed business opportunities and reputational harm. In addition, as management's focus shifts from a direct to an indirect operational control in these areas, there is a risk that without active management and monitoring of the relationship, the services provided may be below appropriate quality standards. Partners may not meet agreed service levels, in which case, depending on the impacted service, our contractual remedies may not fully cure all of the damages we may suffer. This is particularly true for any deficiencies that would impact the reporting requirements applicable to us as a company listed on multiple stock exchanges.

In outsourcing projects, we may encounter disruption to business resulting from broken processes and distraction of our employees that may need to train the partner's staff or be trained in the partner's systems. Adjustments to staff size and transfer of employees to the partner's companies could have an adverse effect on us, for instance through impacting the morale of our employees and raising complex labor law issues and resulting in the loss of key personnel. Additionally, partnering and outsourcing arrangements can create a dependency on the outsourcing company, causing issues in our ability to learn from day-to-day responsibilities, gain hands-on experience, adapt to changing business needs and properly transfer the

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specific know-how to the new outsourcing partners. Concerns could equally arise from giving third parties access to confidential data, strategic technology applications and books and records. There is also a risk that we may not be able to determine whether controls have been effectively implemented, and whether the partner company's performance-monitoring reports are accurate.

We may be subject to increased scrutiny related to our sustainability activities and disclosures, and our reputation and brand as well as the willingness of customers and suppliers to do business with us could be harmed if we fail to meet our sustainability goals.

Our business could be negatively impacted by a failure to appropriately address existing and emerging matters relating to sustainability, good corporate citizenship and diversity. We may fail or be unable to fully achieve one or more of our sustainability targets, such as our greenhouse gas emission commitments, due to a range of factors within or beyond our control, and we may adjust or modify our targets in light of new information, adjusted projections, or a change in business strategy, any of which could negatively impact our brand, reputation, and business. It is also possible that stakeholders may not be satisfied with our sustainability disclosures, targets and practices or the speed of their adoption which could result in action against Nokia by regulators or other third-parties or negative pressure on us or our stock.

ESG regulatory environment is volatile and fast-moving with new standards proposed or adopted by various regulators. A failure to, or perception of a failure to, adapt, disclose metrics and set targets that are rigorous enough or in an acceptable format or otherwise in compliance with applicable regulations, or to prioritize the most relevant sustainability actions and targets, could negatively impact our environmental, social and governance (ESG) related third party ratings, brand, reputation, and business. It is also possible that third-parties rating our ESG practices and performance will make unfavorable, inaccurate or unsubstantiated interpretations of our ESG practices and performance based on their own assessments and publish such interpretations with or without offering a possibility for us to comment. We could also incur additional costs and require additional resources to address evolving regulatory requirements and to monitor and report on our sustainability performance programs, and those of our value chain partners, as required, and to comply with various sustainability practices and disclosure requirements. The lack of standardization in the way data disclosures should be made is making climate-related reporting difficult, which may contribute to challenges for investors to correctly assess disclosures or our ability to comply with each disclosure requirement. In addition to this, the challenge of data collection may affect our ability to accurately evaluate climate-related risk and identify and implement strategies for long term resilience. Furthermore, we foresee that the global rate of technology adoption will be partially driven by sustainability matters such as security and energy efficiency in longer term. Our failure, or perceived failure, to meet sustainability disclosure standards, practices or targets could negatively impact our reputation, employee retention, and the willingness of our customers and suppliers to do business with us.

Risks related to the general economic and financial market conditions and to the industries and markets in which we operate

Our sales and profitability may be materially and adversely affected by general economic and financial market conditions, such as accelerating inflation, increased global macroeconomic uncertainty, major currency fluctuations, higher interest rates and financing costs, and other developments in the economies where we operate.

We are a company with global operations with sales, R&D, manufacturing facilities, partners and suppliers located in various countries around the world. Adverse developments in or the general weakness of global or local economic conditions may have an adverse effect on spending of our customers. For instance, current situation involving Russia and Ukraine, among other factors, has ignited acceleration of inflation and led Europe towards an energy crisis, and it is difficult to estimate, how resilient our industry is against a potential recession fueled by these and other headwinds. The uncertain nature, magnitude, and duration of hostilities stemming from Russia's military invasion of Ukraine, including the potential effects of sanctions limitations, retaliatory cyber-attacks on the world economy and markets, and potential shipping delays, have contributed to increased market volatility and uncertainty, which could have an adverse impact on macroeconomic factors that affect our business and could amplify the existing supply chain challenges faced by us.

Any adverse developments, such as increase in inflation or unemployment, which may affect demand for consumables, such as mobile devices, mobile subscriptions and both the services that end-users subscribe to and the usage levels of such services, may lead communication service providers to invest less in related infrastructure and services or to invest in low-margin products and services, and may also have an adverse effect on the business of our patent, technology or brand licensees and our patent licensing income. Likewise, adverse developments in economic conditions may lead certain customer segments, such as webscale companies, transportation & logistics, energy, manufacturing, and public sector verticals, to invest less or delay spend in infrastructure and services to digitize their operations or to invest in low-margin products and services. Further, the purchasing power of our customers, particularly in developing markets, depends to a greater extent on the price development of basic commodities and currency fluctuations, which may render our products or services unaffordable. Economic slowdown may lead to overcapacity in supply and inflated inventories, and to delays and shortages in case of sharp recovery and ramp-up of demand with a potentially adverse effect on our and suppliers' ability to deliver products and services in time. Increasing inflation and other current market conditions are driving cost increases in operations, materials and labor and may also result in strikes and other industrial actions.

Our industry has been relatively resilient to the effects of COVID-19. Its impact on our operations has been primarily related to temporary factory closures at the beginning of the outbreak and increased remote working and travel restrictions affecting our employees. However, COVID-19 or an appearance of other viral pandemic, may further affect our employees, supply chain, product development, service delivery, other operations and our results, value of our financial, tax, pension and other assets or financial condition will depend on developments, which are highly uncertain and cannot be predicted. Those include, but are not limited to, the duration and spread of pandemic outbreaks, their severity, locations impacted, government's or our actions to contain the viruses or treat their impacts, and how quickly and to what extent normal economic and operating conditions can resume.

General uncertainty and adverse developments in the financial markets could have a material adverse effect on our, our customers', suppliers' and other partners' ability to obtain sufficient or affordable financing on satisfying terms. Uncertain market conditions may increase the price of financing or decrease its availability if the banks and investors were to tighten lending standards or increase interest rates, or if certain assets would decline in value, which could lead to difficulties in raising funds or accessing liquidity necessary to maintain our financial condition and ongoing operations.

We face intense competition and are dependent on development of the industries and markets in which we operate. The markets are cyclical and are affected by many factors, including the general economic environment, technological changes, competitor behavior, customer consolidation and customers' purchase and spending behavior, deployments and rollout timing. Our competition and new competition challenging the connectivity business models of our customers are driving price erosion.

The competitive environment in the markets where we operate, including the related services markets, is characterized by maturing industry technologies, 5G and related new technologies, diversification of supplier ecosystems, equipment price erosion and aggressive price competition. Our competition endeavors to gain market share in selected regions where Nokia has a large footprint. Despite strong growth in mobile data traffic, most of our customer base has been facing persistent revenue erosion and is reverting to vendors to compensate for it. Competition for new customers, as well as for new infrastructure deployment, is particularly intense and focused on the favorability of price and agreement terms. We

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compete with companies that have large overall scale, which affords such companies more flexibility compared to us. In addition, new competition may be entering the network infrastructure and related services business through adoption of new technologies or business models, such as virtualized RAN and O-RAN or products/services as-a-service models.

We are particularly dependent on the investments made by communication service providers in mobile connectivity, network infrastructure and related services. The pace and size of such investments are in turn dependent on the ability of communication service providers to increase their subscriber numbers, reduce churn, maintain or increase their average revenue per user, and compete with business models eroding revenue from traditional voice, messaging and data transport services, as well as the financial condition of such service providers. Their cost containment actions and merger activity have in the past constricted, and may continue to do so in the future, capital expenditure, resulting in further competition and pressure on pricing and profitability. In addition, the investments of the communication service providers in the new spectrum assets may reduce their funds available for investing in the new network infrastructure and related services. Furthermore, the level of demand by communication service providers and other customers that purchase our products and services can change quickly and can vary over short periods of time. Finally, a portion of our revenues is driven by the timing of completion and customer acceptances. As a result of the uncertainty and variations in the telecommunications and vertical industries, accurately forecasting revenues, results and cash flow remains difficult. Furthermore, significant reduction of business with us could result in the loss of benefits related to economies of scale.

We may be unable to respond successfully to technological changes in the markets in which we operate. Market developments favoring new technological solutions, such as Software Defined Networks ("SDNs"), Edge computing, cloud and virtualization, may result in reduced spending to the benefit of our competitors who have, or may have, a stronger position in such technologies. The technological viability of standardized, low-margin hardware products in combination with the virtualization of functions can induce a change in purchase behavior, resulting in favoring other vendors or in higher bargaining power versus Nokia due to more alternative vendors. Our customers may prefer best-of-breed from multiple vendors or turn to alternative vendors to maintain end-to-end services. Additionally, new competitors may enter the industry as a result of acquisitions or shifts in technology. Furthermore, some companies, including webscale companies, may drive a faster pace of innovation in telecommunication infrastructure through more collaborative approaches and open technologies across access, backhaul, core and management.

We expect to generate a significant share of our growth from new customers, including webscale companies and vertical customers in transportation & logistics, energy, manufacturing, and public sector verticals. Each of these sectors may face adverse industry developments, which may significantly impact the size of investments addressable by us and our ability to address these investments, in terms of both having the right products available and being able to obtain new customers and having the right go-to-market capabilities and expertise to address the specific needs of these sectors. Furthermore, there are various incumbent and new players competing with Nokia in these customer groups we strategically target. With these types of customers, the nature of competition and the required capabilities can be significantly different from the communication service provider market, including competition based on access network, core network, cloud infrastructure, platforms, applications and devices, and related services.

Competitive intensity remains high in the market as competitors seek to take share in the 5G rollouts, which is creating a risk of persistent high price erosion in the industry. If domestic and global economic conditions worsen, overall spending on 5G infrastructure may be reduced or delayed, and spending in our other networks products and services might be even more rapidly reduced to preserve the customer investment in 5G, which would adversely impact demand for our products and services in these markets. Further, any reduction in our market share in 5G compared with our installed base in 4G due to decisions to protect our profitability, inability to meet the customers' requirements or other reasons, may have a material negative effect on our scale and profitability.

We are dependent on a limited number of customers and large multi-year agreements. The loss of a single customer or contract, operator consolidation, unfavorable contract terms or other issues related to a single agreement may have a material adverse effect on our business and financial condition.

A significant proportion of the net sales and profits that we generate have historically been derived from a limited number of customers. As consolidation among existing customers continues, it is possible that an even greater portion of our net sales will be attributable to a smaller number of large communication service providers. These developments are also likely to increase the impact on our net sales based on the outcome of certain individual agreement tenders. Communication service providers are also increasingly entering into asset sharing arrangements, as well as joint procurement agreements, which may reduce their investments and the number of networks available for us to service. Furthermore, procurement organizations of certain large communication service providers sell consulting services to enhance the negotiating position of small operators with their vendors.

As a result of the intense competition in the industry, we may be required to agree to increasingly less favorable terms in order to remain competitive. Any unfavorable developments in relation to, or any change in the agreement terms applicable to, a major customer may have a material adverse effect on our business, results of operations and financial condition. Also, agreements in the networks business are typically complex and long-term in nature and it is possible that over time the contract terms of the agreement may prove less favorable to us than originally expected, for instance due to changes in costs and product portfolio decisions, and those may be difficult to amend promptly to address new developments such as the accelerating inflation that we are currently facing. Furthermore, in particular given the bargaining power of our customers or limited legal ability to deviate from the standard governmental contract terms, we may be exposed to onerous terms and liabilities in our customer contracts.

Loss of a single customer, its significant business or contract, or other issues related to a single agreement, may have a material adverse effect on our business and financial condition. We have lost customers and contracts in the past and the same may happen in the future. Furthermore, any suspension, termination or non-performance by us under an agreement's terms may have a material adverse effect on us, for example due to penalties for breaches, early termination or reduced orders or customer footprint. In addition, we may lose existing agreements, or we may be unable to renew or gain new agreements, for instance due to customer diversity policies that limit the ability of customers to have one network provider exceeding a certain threshold of business in a given market or as a result of merger activity where the customer may decide to concentrate their spending elsewhere.

The timing of sales and results of operations associated with large multi-year agreements or turnkey projects may differ significantly from expectations. For instance, recognition of sales and related costs in network implementation projects are often linked with achievement of customer acceptances, which may delay for reasons attributable or not contributable to us. Moreover, such agreements often require dedication of substantial amounts of working capital and other resources, which may adversely affect our cash flow, particularly in the early stages of an agreement's term, or may require us to continue to sell certain products and services, or to sell in certain markets that would otherwise be discontinued or exited, thereby diverting resources from developing more profitable or strategically important products and services, or focusing on more profitable or strategically important markets. Furthermore, our customer agreements may involve complex transformation of the networks as

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the customers deploy new technologies and the related costs and scope of required deliverables may differ from our expectations at the time we enter into such agreements.

We may be adversely affected by developments with respect to customer financing or extended payment terms that we provide to our customers. Unwillingness of banks or other institutions to provide guarantees or financing to our customers or purchase our receivables could impair our capability to enter new customers or markets, to mitigate payment risk and to manage our liquidity.

Requests for customer financing and extended payment terms are typical for our industry and uncertainty in the financial markets and the current lack of liquidity in the financing markets, among other things, may result in increased customer financing requests. In the event that export credit agencies face constraints on their ability or willingness to provide guarantees or financing to our customers, or there is insufficient demand from banks or other financial institutions to purchase receivables, such events could have a material adverse effect on our business and financial condition. Furthermore, reduced availability of credits by export credit agencies supporting our sales could affect our ability to attract customers and enter new markets thus facing the possibility of reduced sales.

In certain cases, the amounts and duration of these financings and trade credits, and the associated impact on our working capital, may be significant. We have agreed to extended payment terms for a number of our customers and may continue to do so in the future. Extended payment terms may result in a material aggregate amount of trade credits and even when the associated risk is mitigated by a diversified customer portfolio, defaults in the aggregate could have a material adverse effect on us.

All in all, our ability to manage our total customer financing and trade credit exposure depends on a number of factors, including capital structure, market conditions affecting our customers, the levels and terms of credit available to us and our customers, the cooperation of export credit agencies and our ability to mitigate exposure on acceptable terms. We may be unsuccessful in managing the challenges associated with the customer financing and trade credit exposure that we may face from time to time, particularly in difficult financial conditions on the market. While defaults under financings, guarantees and trade credits to our customers resulting in impairment charges and credit losses have not been significant for us in the past, these may increase in the future, in particular in markets such as India with increased risks potentially affecting our customers. Further, commercial banks may not continue to be able or willing to provide sufficient long-term financing, even if backed by export credit agency guarantees, due to their own constraints, and certain of our competitors may also have greater access to such financing, which could adversely affect our competitiveness. Additionally, we have sold certain receivables to banks or other financial institutions, and any significant change in our ability to continue this practice could impair our capability to mitigate such payment risk and to manage our liquidity.

Nokia also arranges bank guarantees/bonds and issues commercial guarantees in customers' favor in relation to our business. In the event we are unable to collect outstanding guarantees/bonds, it could limit our possibilities to issue new guarantees/bonds, which are required in customer agreements or practices. We also face a risk that such commercial guarantees/bonds may be unfairly called.

[Risks impacting our competitiveness](#)

We may fail to invest effectively and profitably in new competitive high-quality products, services, upgrades and technologies or bring them to market in a timely manner. We also may fail to adapt to changing business models.

The industries in which we operate are characterized by rapidly evolving technologies, frequent new technological requirements, product feature introductions and evolving industry standards. The participants in the markets where we operate compete on the basis of product and service offerings, technical capabilities and quality in addition to price and affordability.

The R&D of new and innovative, technologically advanced products, as well as upgrades to current products and new generations of technologies, is a complex and an uncertain process requiring high levels of innovation and investment, including trying to accurately anticipate the technological, regulatory and market trends. We may focus our resources on products and technologies that do not become widely accepted or ultimately prove unviable. Additionally, many of our current and planned products are highly complex and may contain defects or errors that are, for instance, detected only after deployment in telecommunications networks. Even if we invest in new competitive products, services, upgrades or technologies such as 5G-Advanced, internet of things ("IoT"), the cloud or software and manage proactively the costs related to our portfolio of products and services, including component sourcing, manufacturing, logistics and other operations, we may still fail to maintain or improve our market position, competitiveness or scale and keep prices and costs at competitive levels or provide high-quality products and services.

Our business performance and results of operations will depend to a significant extent on our ability to succeed in the following areas:

- maintaining and developing a competitive product portfolio and service capability that are attractive to our customers, for instance by keeping pace with technological advances in our industry and pursuing technologies that become commercially accepted and price competitive;
- maintaining compliance with regulatory requirements and standards;
- to introduce new products, services and upgrades of current products and to do so on a cost-efficient and timely basis;
- developing new or enhancing existing processes and tools for our service offerings;
- optimizing the amount of customer or market-specific technology, product and feature variants in our product portfolio;
- continuing to meet evolving expectations and enhance the quality of our products and services, comply with emerging industry standards as well as introducing products and services that have desired features and attributes, such as energy efficiency;
- maintaining and building up strategic partnerships in our value creation chain (e.g. in product creation and project delivery); and
- leveraging our technological strengths and addressing competing technological and product developments carried out by competitors while keeping prices and costs at competitive levels.

Certain of our competitors have significant resources to invest in market exploration and may seek new monetization models or drive industry development and capture value in areas where we may not currently be competitive or do not have similar resources available to us. These areas may include monetization models linked to large amounts of consumer data, large connected communities, home or other entertainment services, alternative payment mechanisms or marketing products. We also face competition from various companies that may be able to develop technologies or products that become preferred over those developed by us or result in adverse effects on us through, for instance, developing technological innovations that make our innovations less relevant. In addition, reduced government funding and support for our R&D activities could affect our ability to develop new technology or products.

Inefficiencies, incidents, malfunctions or disruptions of information technology systems and processes could have a material adverse effect on our business and results of operations. As our business operations, including those we have outsourced, rely on complex IT systems, networks and related services, our reliance on the precautions taken by us and external companies to ensure the reliability of our and their IT systems, networks and related services is increasing. Consequently, certain disruptions in IT systems and networks affecting us and our external providers could also have a material adverse effect on our business.

All IT systems, networks and processes are potentially vulnerable to damage, incidents, malfunction or interruption from a variety of sources. Our operations rely on the efficient and uninterrupted operation of complex and centralized IT systems, networks and processes, which are integrated with those of third parties. The ongoing migration to cloud-based architectures and network function virtualization has introduced further complexity and associated risk.

We are, to a significant extent, relying on third parties for the provision of IT services. While we have outsourced certain functions, we have also increased our dependence on the reliability of external providers as well as on the security of communication with them. We may experience disruptions if our partners do not deliver as expected or if we are unable to successfully manage systems and processes together with our business partners. We will often need to use new service providers and may, due to technical developments or choices regarding technology, increase our reliance on certain new technologies, such as cloud and certain other services that are used over the internet rather than using a traditional licensing model. Switching to new service providers and introducing new technologies is inherently risky and may expose us to an increased risk of disruptions in our operations, for instance due to network inefficiency or outage, a cybersecurity or a compliance incident, malfunctions, failure in disaster recovery/IT service continuity or other disruptions resulting from IT systems and processes.

We are constantly seeking to improve the quality and security of our IT systems. However, despite precautions taken by us, we may fail to successfully secure our IT and any malfunction or disruption of our current or future systems or networks, such as an outage in a telecommunications network used by any of our IT systems, or a cybersecurity incident, such as an attack, malware, ransomware or other event that leads to an unanticipated interruption or malfunction of our IT systems, processes, networks or data leakages, could have a material adverse effect on our business, results of operations and brand value. A disruption of services relying on our IT, for instance, could cause significant discontent among customers and their end-users resulting in claims, contractual penalties or deterioration of our brand value. Further, while we are increasing our investments in digitalizing our operations and transforming our IT, the legacy IT systems may be gradually more vulnerable to malfunction, disruptions or security incidents than the new IT systems replacing them.

We are exposed to risks related to information security. Our business model relies on solutions for distribution of services and software or data storage, which entail inherent risks relating not only to applicable regulatory regimes, but also to cybersecurity incidents and other unauthorized access to network data or other potential security risks that may adversely affect our business and/or compromise personal data. Our business and operations rely on confidentiality of proprietary and other sensitive information, for instance related to our employees and our customers, including our government customers. Our business models rely on certain centralized data processing solutions and cloud or remote delivery-based services for distribution of services and software or data storage, accessible by our partners or subcontractors according to the roles and responsibilities defined.

We, our subsidiaries and joint ventures, products and online services, marketing and developer sites and third parties that we contract have been and may in the future be subject to cybersecurity incidents, including hacking, ransomware, viruses, worms and other malicious software, unauthorized modifications, or illegal activities that may cause potential security risks and other harm to us, our customers or consumers and other end-users of our products and services. IT is rapidly evolving, the techniques used to obtain unauthorized access or sabotage systems change frequently and the parties behind cyber-attacks and other industrial espionage are believed to be sophisticated and have extensive resources, and it is not commercially or technically feasible to mitigate all known vulnerabilities in a timely manner or to eliminate all risk of cyber-attacks and data breaches. Additionally, we contract with multiple third parties in various jurisdictions who collect and use certain data on our behalf. Although we have processes in place designed to ensure appropriate collection, handling and use of such data, third parties may use the data inappropriately or breach laws and agreements in collecting, handling or using or leaking such data. Our business is also vulnerable to theft, fraud or other forms of deception, sabotage and intentional acts of vandalism by third parties and employees. Further, compared to our fully integrated group companies, our ability to mitigate and oversee risk of cyber-attacks and data breaches may be more limited in our joint venture companies and other group companies having their own governance and system infrastructure, such as our local service companies focusing on networks field services.

The cybersecurity incidents may lead to lengthy and costly incident response, remediation of the attack or breach, legal proceedings and fines imposed on us, as well as adverse effects to our reputation and brand value. Additionally, cyber-attacks can be difficult to prevent, detect or contain. We cannot rule out the possibility that there may have been cyber-attacks that have been successful and/or evaded our detection. We continue to invest in risk mitigating actions; however, there can be no assurance that such investments and actions will prevent or detect future cyber-attacks. Additionally, the cost and operational consequences of implementing further information system protection measures, especially if prescribed by national authorities, could be significant. We may not be successful in implementing such measures in due time, which could lead to business disruptions and the implementation to be more expensive, time-consuming and resource intensive. Regulatory framework around responding to and disclosing such events is in flux. We may not be able to comply with the regulations that may be implemented or such compliance may negatively impact our ability to deal with the underlying event.

In connection with providing products and services to our customers, certain personal and consumer data are collected, stored and processed through us, either by us or by our business partners or subcontractors in various jurisdictions. Loss, improper disclosure or processing or leakage of any personal or consumer data collected by us, or which is made available to us or our partners or subcontractors or stored in or through our products and services, could have a material adverse effect on us and harm our reputation and brand. Additionally, governmental authorities may misuse our networks products to access the personal data of individuals without our involvement; for example, through the so-called lawful intercept capabilities of network infrastructure, impairing our reputation.

We may face problems or disruptions in manufacturing, service creation, delivery, logistics or supply chain. Such challenges include securing availability of resources or components to meet the demand, ability to adapt supply, defects in products or related software or services and achieving required efficiencies and flexibility. Our suppliers/partners may fail to meet product quality, health, safety or security requirements or comply with other regulations or local laws, such as environmental, social or labor laws. Additionally, adverse events, such as geopolitical disruptions, natural or man-made disasters, civil unrest or health crises, have and may continue to have an impact on our service delivery, production sites or the production sites of our suppliers/partners which are geographically concentrated.

We have an extensive supply network. As a consequence of global supply chain disruptions, ability to secure supply is an increasingly important customers' vendor selection criterion. We, or third parties that we outsource manufacturing/services to, may experience difficulties in adapting supply to meet the changing demand for our products and services, ramping up and down production, adjusting network implementation capabilities as needed on a timely basis, maintaining an optimal inventory level, adopting new manufacturing processes, finding the most timely

way to develop the best technical solutions for new products, managing the increasingly complex manufacturing process, service creation and delivery process or achieving required efficiencies and flexibility. In addition, these operations are exposed to various risks and potential liabilities, including those related to geopolitics, compliance with laws and regulations, exposure to environmental liabilities or other claims.

Our manufacturing operations depend on obtaining sufficient quantities of fully functional products, components, sub-assemblies, software, services, energy and other resources on a timely basis. In certain cases, a particular component or service may be available only from a limited number of suppliers or from a single supplier in the supply chain. Suppliers have and may, from time to time, extend lead times, limit supplies, change their partner preferences, increase prices, provide poor quality supplies or be unable to adapt to changes in demand due to capacity constraints or other factors, which could adversely affect our ability to deliver our products and services on a timely basis or increase our costs. For example, the global semiconductor components shortage constrained our deliveries and the continuing uncertainty around components, raw material availability and potential energy shortages in the market limit our visibility and may continue to have an impact on our ability to supply to our customers and increase our costs. We are working closely not only with our suppliers to ensure component availability but also with our customers to ensure we can meet their needs. We are also building up critical material buffers to be prepared to balance short term disruptions. Many of our competitors and also companies from other industries utilize the same contract manufacturers, component suppliers and service vendors. If they have purchased capacity or components ahead of us, or if there is significant consolidation in the relevant supplier base, this could prevent us from acquiring the required components or services, which could limit our ability to supply our customers and increase our costs.

Our products are highly complex and defects in their design, manufacture and associated hardware, software, content and installation have occurred in the past and may continue to occur in the future. Quality issues may cause, for instance, delays in deliveries, loss of intellectual property, liabilities for network outages, court fees and fines due to breaches of significantly increasing regulatory privacy requirements and related negative publicity, and additional repair, product replacement or warranty costs to us, and harm our reputation and our ability to sustain or obtain business with our current and potential customers. With respect to our services, quality issues may relate to the challenges of having the services fully operational at the time they are made available to our customers and maintaining them on an ongoing basis. We may also be subject to damages due to product liability claims arising from defective products and components. We make provisions to cover our estimated warranty costs for our products and pending liability claims. We believe our provisions are appropriate, although the ultimate outcome may materially differ from the provisions that are provided for, which could have a material adverse effect on us.

A large proportion of our manufacturing, service creation and delivery is carried out by third-party suppliers. These vary in size and often engage a number of tiers of suppliers, which limits our direct control. Supplier may fail to meet our supplier requirements, such as our and our customers' product quality, safety, security and other standards. Certain suppliers may not comply with local laws, including, among others, local labor law, health and safety or environmental requirements. The activities we manage or that are managed by third parties for us may also be subject to negative publicity and purchasing boycotts, strikes or other forms of social, political, economic or environmental activism. These all can lead to exposure in the form of litigation, product recalls or brand damage through association.

Many of our production sites or the production sites of our suppliers/partners are geographically concentrated, with a majority of such suppliers/partners based in Asia. We rely on efficient logistic chain elements, such as regional distribution hubs or transport chain elements (main ports, streets, and airways). We are working on gradually increasing the regionalization of our supply network to increase resilience. However, in the event that any of these geographic areas are affected by any adverse conditions that disrupt production or deliveries from our suppliers/partners, such as trade restrictions, severe impacts of environmental events, geopolitical events, man-made or natural disasters (for instance, flooding, heavy rain or extreme heat that the climate change is expected to further intensify), war, civil unrest or health crises such as the COVID-19 pandemic, our ability to deliver our products on a timely basis could be adversely affected. In a similar manner, these adverse conditions may also cause disruption to our service creation and delivery, which, in either case, may lead to a material adverse effect on our business and results of operations.

Competition for employees and leaders is increasing globally. We may be unable to retain, motivate, develop, reskill and recruit appropriately skilled employees or we may fail in workforce balancing. Employees may face change fatigue, reduction in motivation and energy as a secondary effect of the global pandemic and as our efforts to evolve our business and improve efficiency continue.

Our success in executing our strategy, to address opportunities in new technologies and business models and customer segments in particular, requires and is dependent on our ability to retain, motivate, develop, reskill and recruit appropriately skilled employees and in particular those with relevant technical expertise. We recently announced as a strategic priority for 2022 our intention to extend product leadership with focused R&D in strategic growth areas through next generation network processor, digital service providers, software and network automation, which will depend on the retention, motivation and recruitment of employees with relevant technical expertise. At the same time, the market for skilled employees is increasingly competitive, particularly given the similar technology trends affecting various industries simultaneously and increased remote working expanding the job market for individual employees. We have encountered, and may in the future encounter, shortages of appropriately skilled employees or lose key employees or senior management. There can be no assurances that we will be able to implement measures successfully to retain or hire the employees we need. This may require significant time, attention and resources from our senior management and other key employees within our organization and may result in increased costs or otherwise have a material adverse effect on us.

In 2021, we announced the plans to reset the cost base of our business groups to invest in future capabilities. We may fail in our efforts to rebalance our workforce as planned, for instance due to legal restrictions or collective bargaining agreements, which may result in a non-optimal workforce, larger than expected costs and not meeting our financial targets for such plans. Our inability to negotiate successfully with employee representatives or failures in our relationships with such representatives could result in strikes and other industrial actions by the employees which may in turn result in significant disruption in our day-to-day operations and higher ongoing labor costs.

In response to our experience during the COVID-19 pandemic and our employees' feedback, we provide flexibility for employees to work up to three days a week remotely and increased support for flexible working hours and fully virtual working. With the permanently increasing share of remote working, there is a risk that we may be exposed to a larger extent than before to impacts related to remote work and arranging the home office, such as increased attrition, decreased creativity or productivity of employees, supervising working hours, challenges in identifying, assessing and supporting employees in stress or poor mental health, inability to help employees to work safely in their home office environment or developing and supervising the execution of related internal policies leading to potential health issues and litigation.

Our efforts aimed at managing and improving our competitiveness, financial or operational performance may not lead to targeted results, benefits, cost savings or improvements.

We are continuously targeting increased efficiency of our operations. For instance, in March 2021, we announced plans to reset our cost base, targeting a reduction of approximately EUR 600 million by the end of 2023. Given the strength in our end markets, the pace of restructuring in 2021 and 2022 has been slower than we initially planned. The overall size of the plan, however, remains unchanged and continues to depend on the evolution of our end markets. Failure by us to determine the appropriate prioritization of operating expenses and other costs, to identify and

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implement the appropriate measures to improve cost-efficiency, increase simplicity or to adjust our operating expenses and other costs on timely basis, or to maintain achieved efficiency levels, could limit our future investments and have a material adverse effect on our business, results of operations and financial condition. Our current and future cost-saving measures may be costly, potentially disruptive to operations, and may not lead to sustainable improvements in our overall competitiveness and profitability and there can be no assurance that such measures will be met as planned in contemplated timeframes or at all. Our plans may be altered in the future, including adjusting any projected financial or other targets. The anticipated costs or the level of disruption expected from implementing such plans or restructurings may be higher than expected. Efforts to plan and implement cost-saving initiatives may divert management attention from the rest of the business and adversely affect our business.

There are also several other factors that may prevent or delay a successful implementation of any cost-saving initiatives, including, among others, the following:

- need to make additional investments in other areas such as 5G-Advanced and 6G, security, cloud, development of new standard essential patents and automation/digitalization of our operations;
- inaccuracy in our expectations with respect to market growth, customer demand and other trends;
- legislative constraints or unfavorable changes in legislation in the markets in which we operate influencing timing, costs and expected savings of certain initiatives contemplated;
- our ability to swap equipment of certain customers in line with our future product lines development and to secure continued business from such customers;
- our ability to align and adjust resources, systems, tools, including digitalization and automation of processes, related to implementation of planned organizational changes;
- intended business plans may require us to inform or consult with employees and labor representatives, and such processes may influence the timing, costs and extent of expected savings and the feasibility of certain of the initiatives contemplated;
- accelerating inflation driving increase in cost base; and
- bargaining power of our suppliers may prevent us from achieving targeted procurement savings.

Furthermore, cost-saving initiatives, including in R&D, may negatively affect our ability to develop new or improve existing products and compete effectively in certain markets, and there is no guarantee that we will continue to be able to successfully innovate or remain technologically competitive.

[Risks associated with intellectual property rights, technology and brand licensing](#)

Our patent licensing income and other intellectual property-related revenues are subject to risks and uncertainties such as our ability to maintain our existing sources of intellectual property-related revenue, establish new sources of revenue and protect our intellectual property from infringement. A proportionally significant share of the current patent licensing income is generated from the smartphone market, which is rapidly changing and features a limited number of large vendors.

The continued strength of our intellectual property portfolios depends on our ability to create new relevant technologies, products and services through our R&D activities and to protect our intellectual property rights (IPR). If those technologies, products and services do not become relevant, and therefore attractive to potential licensees, the strength of our intellectual property portfolios could be reduced. Despite the steps that we have taken to protect our technology investments with IPR, we cannot be certain that any rights or pending applications will be granted or that the rights granted in connection with any future patents or other IPR will be valid and sufficiently broad to protect our innovations and maintain the relative strength of our portfolio. Third parties may infringe our intellectual property relating to our proprietary technologies or disregard their obligation to seek necessary licenses under our patents or seek to pay less than reasonable license fees. As a result, we may be unable to continue to develop or protect our intellectual property-related revenue or establish new sources of revenue.

Regulatory and other developments regarding protection awarded to technology innovations or compensation trends with respect to licensing may impact our ability to protect, monetize or divest our intellectual property. Any patents or other IPR may be challenged, invalidated or circumvented, and any right granted under our patents may not provide competitive advantages for us. In the technology sector generally, certain licensees are actively avoiding concluding license agreements on fair and reasonable commercial terms, or are withholding making license payments, while some suggest that licensors may be able to collect unreasonably high license payments, with both behaviors attracting regulatory attention. Authorities in various countries have increasingly monitored patent monetization and may aim to influence the terms on which patent licensing arrangements or patent divestments may be executed, which could compromise control over or protection of our technology and proprietary information. Such terms may be limited to a certain country or region; however, authorities could potentially seek to widen the scope and even impose global terms, potentially resulting in an adverse effect on us or limiting our ability to monetize our patent portfolios.

There is no assurance that past levels are indicative of future levels of intellectual property-related revenue. Poor performance by any of Nokia's patent, technology or brand licensees may impact Nokia financially, for example, if a licensee's ability to pay is reduced, the licensee decides to divest or scale back a particular part of its business or it becomes insolvent or bankrupt. Additionally, poor performance of potential or current licensees may limit a licensee's motivation to seek new or renew existing licensing arrangements with us. Furthermore, patent license agreements can cover licensees' both past and future sales, and the portion of the income that relates to licensees' past sales is not expected to have a recurring benefit. Ongoing patent income from licensing is generally subject to various factors (for instance, sales by the licensees) that we have little or no control over, and it can vary considerably from time to time based on factors such as the terms of agreements we enter into with licensees.

We seek to expand the scope of our licensing activities to other industries, in particular those that implement mobile communication and multimedia technologies, such as the automotive, consumer electronics and IoT industries. The players in some of these industries may not have traditionally paid intellectual property-related royalties and the expansion of our licensing activities into such industries may involve litigation. In addition, entering highly fragmented markets or markets with a high volume of licensees may affect our effectiveness and/or profitability.

We retained our patent portfolio after the sale of Devices & Services business in 2014. Following the sale of Devices & Services business, Nokia is no longer required to agree upon cross-licenses to cover Nokia's handset business, which has contributed to growing our licensing revenue. While this has been our practice, there can be no guarantee that this can be continued in the future. Also, in the past, parts of our intellectual property development were driven by innovation from the Devices & Services Business. As we no longer own this business, our future intellectual property relating to the mobile phone sector may lessen and our ability to influence industry trends and technology selections may reduce.

We also enter into business agreements on behalf of our business groups, which may grant certain licenses to our patents. Some of these agreements may inadvertently grant licenses to our patents with a broader scope than intended, or they may otherwise make the enforcement of our patents more difficult.

To renew existing license agreements and conclude new license agreements with potential licensees, we may and have engaged in legal actions to enforce our intellectual property rights against unlawful infringement, the outcomes of which are uncertain.

Intellectual property-related disputes are common in the technology industry. While we strive to reach negotiated settlements of any disputes in relation to license agreements with companies using our intellectual property, sometimes it is necessary to engage in litigation or arbitration in order to renew existing license agreements which have expired or conclude new license agreements with unlicensed parties. In certain cases, we have engaged in litigation or arbitration proceedings to enforce our rights, for instance to enforce our patents or to establish the terms of a patent license agreement. Due to the nature of litigation and arbitration proceedings, there can be no assurances as to the final outcome, timing, or costs involved in such litigation or arbitration proceedings or as to our ability to renew existing license agreements or conclude new license agreements with potential licensees on acceptable commercial terms.

In other cases, other companies have commenced and may continue to commence actions against us seeking to establish the invalidity of our intellectual property, including our patents, or to contest our licensing practices or file competition law complaints with courts or competition authorities. In the event that one or more of our patents is challenged, a court may invalidate the patent or determine that the patent is not enforceable. The outcome of court proceedings is difficult to predict and, consequently, our ability to use intellectual property for revenue generation may from time to time depend on favorable court rulings. Additionally, if any of our patents is invalidated, or if the scope of the claims in any patents is limited by a court decision, we could be prevented from using such patents as a basis for product differentiation or from licensing the invalidated or limited portion of our IPR. Even if such a patent challenge is not successful, the related proceedings could be expensive and time-consuming, divert the attention of our management and technical experts from our business and have an adverse effect on our reputation. Any diminution in the protection of our IPR could cause us to lose certain benefits of our R&D investments.

While the primary source of Nokia Technologies business group net sales and profits is licensing of the Nokia patents, we are also engaged with licensing of technologies and of the Nokia brand, as well as with other business ventures, including technology innovation and incubation. Expected net sales and profitability for these businesses may not materialize as planned or, for some of these businesses, at all.

Nokia Technologies has a strategic agreement covering branding rights and intellectual property licensing with HMD Global Oy (HMD). Under the agreement, Nokia receives royalty payments from HMD for sales of Nokia-branded mobile phones and tablets, covering both brand and patent licensing. Following a loan conversion in 2020, Nokia currently has a non-controlling ownership interest in HMD.

Nokia also has a small number of territorially restricted brand licensing agreements beyond mobile devices and is exploring further opportunities to license the brand in new categories. However, there can be no assurance that we will successfully reach additional new brand licensing arrangements at all or on terms that prove satisfactory to us. The agreement with HMD limits Nokia's possibilities to license the Nokia brand for certain types of devices over an agreed time and is as such limiting Nokia's licensing possibilities with respect to such devices.

Nokia has limitations in its ability to influence HMD or other brand licensees in their business and other operations, exposing us to potential adverse effects from the use of the Nokia brand by HMD or other brand licensees or other adverse developments encountered by brand licensees that become attributable to Nokia. For instance, in case the licensee acts inconsistently with our ethical, compliance or quality standards, it could negatively affect our reputation and the value of our brand, thus diminishing the business potential with respect to utilizing our brand for licensing opportunities or otherwise having a negative effect on our business.

There can be no assurances that our Nokia Technologies business group, or any other part of Nokia, will be successful in innovation and incubation or in generating net sales and profits through its business plans, for instance in patent, technology and brand licensing. The industries in which we operate, or may operate in the future, are generally fast paced, rapidly evolving, innovative and at different levels of maturity. Additionally, we are entering into new business areas based on our technology assets and may explore new business ventures. Such business areas or plans may be adversely affected by adverse industry and market developments in the numerous diverse markets in which we operate, and the investments we make may not achieve the targeted scale, intended benefits or yield expected rates of return.

Our products, services and business models depend on technologies that we have developed as well as technologies that are licensed to us by certain third parties. As a result, evaluating the rights related to the technologies we use or intend to use is increasingly challenging, and we expect to continue to face claims that we have allegedly infringed third parties' IPR. The use of these technologies may also result in increased licensing costs for us, restrictions on our ability to use certain technologies in our products and/or costly and time-consuming litigation.

Our products and services include increasingly complex technologies that we have developed or that have been licensed to us by certain third parties. The amount of such proprietary technologies and the number of parties claiming to own relevant IPR continue to increase. The holders of patents and other IPR potentially relevant to these complex technologies may be unknown to us, may have different business models, may refuse to grant licenses to their proprietary rights or may otherwise make it difficult for us to acquire a license on commercially acceptable terms. If licensing agreements are not available on commercially acceptable terms, we could be precluded from making and selling the affected products or could face increased licensing costs. As new features are added to our products, we may need to acquire further licenses, including from new and sometimes unidentified owners of intellectual property. The lack of availability of licenses for copyrighted content, delayed negotiations or restrictive IPR license terms may have a material adverse effect on the cost or timing of content-related services and products offered by us, mobile network operators or third-party service providers. The cumulative costs of obtaining any necessary licenses are difficult to predict and may be significant.

Additionally, although we endeavor to ensure that we and the companies collaborating with us possess appropriate IPR or licenses, we cannot fully avoid the risks of IPR infringement by suppliers of components, processes and other various layers in our products, or by companies with which we collaborate. Similarly, we and our customers may face claims of infringement in connection with the use of our products. Any restrictions on our ability to sell our products due to expected or alleged infringements of third-party IPR and any IPR claims, regardless of merit, could result in a material loss of profits, costly litigation, the obligation to pay damages and other compensation, the diversion of the attention of our key employees, product shipment delays or the need for us to develop non-infringing technology or to enter into a licensing agreement on unfavorable commercial terms.

In line with standard practice in our industry, we generally indemnify our customers for certain intellectual property-related infringement claims initiated by third parties relating to products or services purchased from us. These may include claims from non-practicing entities having no product or service business. If such claims are made directly against our customers, we may have limited opportunities to participate in the processes including in negotiations and in defenses, or to evaluate the outcomes and resolutions in advance. All IPR indemnifications can result in

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significant payment obligations for us that are difficult to estimate in advance. Moreover, our indemnification responsibilities typically arise whether or not the IPR assertions against our customers have merit.

Since all technology standards that we use and rely on, including mobile communication technologies such as the Universal Mobile Telecommunications System ("UMTS"), Long-Term Evolution ("LTE") and 5G, or fixed line communication technologies, include certain IPR, we cannot avoid risks of facing claims for infringement of such rights due to our reliance on such standards. We believe the number of third parties declaring their patents to be potentially relevant to these standards is increasing, which may increase the likelihood that we will be subject to such claims in the future. As the number of market entrants and the complexity of technologies increase, it remains likely that we will need to obtain licenses with respect to existing and new standards from other licensors. While we believe most of such IPR actually found to be essential to a particular standard carries an obligation to be licensed on fair, reasonable and non-discriminatory terms, not all intellectual property owners agree to apply such terms, nor do all owners agree on what is fair, reasonable and non-discriminatory. As a result, we have experienced costly and time-consuming litigation proceedings against us and our customers or suppliers over such issues and we may continue to experience such litigations in the future.

From time to time, certain existing patent licenses may expire or otherwise become subject to renegotiation. The inability to renew or finalize such arrangements or renew licenses with acceptable commercial terms may result in litigation, which may be expensive and time-consuming and divert the efforts of our management and technical experts from our business and, if decided against us, could result in unfavorable judgments, restrictions on our ability to sell certain of our products, require us to pay increased licensing fees, fines or other penalties and expenses, and/or to enter into costly settlements.

Our patent license agreements may not cover all the future businesses that we may enter, our existing business may not necessarily be covered by our patent license agreements if there are changes in our corporate structure or our subsidiaries, or our newly acquired businesses may already have patent license agreements with terms that differ from similar terms in our patent license agreements. This may result in increased costs, restrictions in the use of certain technologies or time-consuming and costly disputes whenever there are changes in our corporate structure or our subsidiaries, or whenever we enter into new business areas or acquire new businesses.

We make accruals and provisions to cover our estimated total direct IPR costs for our allegedly infringing products. Our estimated total direct IPR costs take into account items such as payments to licensors, accrued expenses under existing agreements and provisions for potential liabilities. We believe our accruals and provisions are at an appropriate level. The ultimate outcome, however, may differ from the provided level, which could have an adverse impact on us.

Risks stemming from geopolitical, legal, regulatory and compliance environment

Current international trends show increased enforcement activity in areas such as national security, competition law, export control and sanctions, privacy, cybersecurity, climate change, human rights and anti-corruption. Furthermore, we have observed an increase in the adoption of surveillance, data localization, national sourcing and national hiring requirements, regulations and policies, as well as regulators' increased interest in regulatory reform and reorganization and their growing appetite for tackling topics such as non-personal data, artificial intelligence, open access and net neutrality.

We conduct our business globally, being subject to direct and indirect regulation and exposed to geopolitical and regulatory risks, such as push for localization, unfavorable or unpredictable treatment in relation to trade sanctions, tariffs, tax matters and export controls, exchange controls, and other restrictions.

Our business and activities cover multiple jurisdictions and are subject to complex regulatory frameworks, political turmoil, regulatory and economic developments such as trade barriers, tariffs, geopolitical conflicts and military actions, labor unrest, civil unrest, and public security and safety threats, which could have a material adverse effect on us and our supply chain, our ability to sell or supply products and services, including network infrastructure equipment and components manufactured in such countries.

As a result of Russia's invasion of Ukraine, the United States, the United Kingdom and the European Union governments, among others, have developed and implemented coordinated economic and financial sanctions packages. These include, among others, restrictions on selling or importing goods, services, or technology in or from affected regions, travel bans and asset freezes impacting connected individuals and political, military, business, and financial organizations in Russia, severing large Russian banks from U.S. and/or other financial systems, and barring some Russian enterprises from raising money in the U.S. market. As the invasion of Ukraine continues, there can be no certainty regarding whether such governments or other governments will impose additional sanctions, or other economic or military measures against Russia. The impact of the invasion of Ukraine, including economic sanctions or additional war or military conflict, as well as potential responses to them by Russia, is currently unknown and they could adversely affect our business, supply chain, suppliers, customers and potential consumer demand for our products. It is not possible to predict the broader consequences of this conflict, which could include further sanctions, embargoes, regional instability, geopolitical shifts and adverse effects on macroeconomic conditions, the availability and cost of raw materials, supplies, freight and labor, currency exchange rates and financial markets, all of which could impact our business, financial condition and results of operations.

We have witnessed political unrest in the past in various markets in which we conduct business or in which we have operations, which has adversely affected our sales, profitability or operations in these markets, and also in certain cases affected us outside these countries or regions. Any reoccurrence or escalation of such unrest could have a further material adverse effect on our sales or results of operations. Should we decide to exit or otherwise alter our presence in a particular market, this may have an adverse effect on us through, for example, disruption to our operations in the event we need to relocate significant part of our operations, triggered investigations, tax audits by authorities, claims by contracting parties or reputational damage. The results and costs of investigations or claims against our international operations may be difficult to predict and could lead to lengthy disputes, fines or fees, indemnities or costly settlements.

The regulatory, trade controls and sanctions legal environment can be difficult to navigate for companies with global operations, impacting ability to grow or maintain business in specific markets or enter new markets. For example, the diverging EU and US regulatory frameworks governing business activities in Iran continue to be complex and as a European company, it will require reconciling the occasionally opposing foreign policy regimes of the US and the EU. As a global operator, Nokia conducts business subject to export controls regulations and in countries subject to various sanctions and our business may be impacted by new, existing or tightened export control regulations, sanctions, embargoes or other forms of economic and trade restrictions imposed on certain countries, regions and entities. Although we strive to conduct all operations of Nokia, and in particular any operations undertaken in countries targeted by sanctions in accordance with our compliance program, we cannot ensure that breaches will not occur.

Export controls, tariffs or other fees or levies imposed on our products and environmental, health, product safety, data protection and security, consumer protection, money laundering and other regulations that adversely affect the export, import, technical design, pricing or costs of our

products could also adversely affect our sales and results of operations. Further, we rely on a multilateral trade regime underpinned by the World Trade Organization and its Information Technology Agreement. Conflicts between countries and geopolitical tensions may lead to implementation of or uncertainties with respect to any measures limiting trade of products and services affecting our customers' ability or willingness to invest in capital expenditures and increasing our costs or having adverse impacts on our operations and supply chain.

We have a significant presence in emerging markets in which the political, economic, legal and regulatory systems are less predictable than in countries with more developed institutions. These markets represent a significant portion of our total sales, and a significant portion of expected future industry growth. Most of our suppliers are located in, and our products are manufactured and assembled in, emerging markets, particularly in Asia. Our business and investments in emerging markets may also be subject to risks and uncertainties, including unfavorable or unpredictable treatment in relation to tax matters, exchange controls, restrictions affecting our ability to make cross-border transfers of funds, regulatory proceedings, unsound or unethical business practices, challenges in protecting our IPR, information security, nationalization, inflation, currency fluctuations or the absence of or unexpected changes in regulation, as well as other unforeseeable operational risks.

Our business and results of operations may be adversely affected by regulation favoring the local industry participants, as well as other measures with potentially protectionist objectives or outcomes that host governments in various countries may take. Governments and regulators, particularly after changes in political regimes, may make legal and regulatory changes, slow down or reverse the adoption of favorable policy measures, or interpret and apply existing laws in ways that make our products and services less appealing to customers or require us to incur substantial costs, change our business practices or prevent us from offering our products and services. In particular, there is a growing trend in many countries to require minimum local content in products and/or services, and we may be required to invest in certain movement of operations or joint ventures to retain market share. Restrictive government policies or actions, such as measures related to pandemics, limitations on visas or work permits for certain foreign workers, may make it difficult for us to move our employees into and out of these jurisdictions. Our operations and employee recruitment and retention depend on our ability to obtain the necessary visas and work permits for our employees to travel and work in the jurisdictions in which we operate. The impact of changes in or uncertainties related to general regulation and trade policies could adversely affect our business and results of operations even in cases where the regulations do not directly apply to us or our products and services.

Our operations may be adversely affected by ongoing developments related to the Russian invasion of Ukraine, including due to the impact of our decision to discontinue our operations in Russia.

The uncertain nature, magnitude, and duration of hostilities stemming from Russia's invasion of Ukraine, including the potential effects of sanctions limitations on the world economy and markets, have contributed to increased market volatility and uncertainty, which could have an adverse impact on macroeconomic factors that affect our business. As a result of Russia's invasion of Ukraine, the United States, the United Kingdom and the European Union governments, among others, have developed coordinated economic and financial sanctions packages. These include, among others, restrictions on selling or importing goods, services, or technology in or from affected regions, travel bans and asset freezes impacting connected individuals and political, military, business, and financial organizations in Russia and severing large Russian banks from U.S. and/or other financial systems.

In 2021, Russia and Ukraine accounted for less than 2% of our net sales. In addition to our main operational subsidiaries, we also have two minor joint ventures in Russia. One of the joint ventures was established for an educational partnership with a local university. The other joint venture has, as an indirect shareholder, Rostelecom PJSC which is currently subject to international sanctions, the most relevant being the sectoral sanctions implemented by the U.S. Office of Foreign Assets Control ("OFAC"). Given the ownership structure of that joint venture, the U.S. sectoral sanctions applicable to Rostelecom PJSC extend to the joint venture. Pursuant to Directive 3 issued under Executive Order 14024, those sectoral sanctions prohibit U.S. persons from certain dealings in new debt and equity of the sanctioned entity, but do not prohibit other dealings. OFAC has also issued General License 25A which authorizes certain telecommunications related transactions that would otherwise be prohibited by the sanctions. The transactions permitted under the General License include, among others, "the exportation or reexportation, sale, or supply, directly or indirectly, from the United States or by U.S. persons, wherever located, to the Russian Federation of services, software, hardware, or technology incident to the exchange of communications over the internet". In addition, Nokia's dealings with Rostelecom and the joint venture do not generally have a U.S. person nexus and would therefore not be restricted by the U.S. sanctions. The joint venture is not currently subject to targeted EU sanctions. We are complying with all applicable sanctions and restrictions and, to ensure this compliance, all transactions between members of the Group and Rostelecom PJSC or the joint venture are reviewed by our trade compliance team and external counsel where deemed necessary. Our participation in this joint venture is being unwound: we have entered into agreements providing for the ramp down of the activities of the joint venture and disposal of our equity interest in, or liquidation of, the joint venture subject to applicable governmental approvals. We no longer have representatives on the board of directors of the joint venture and have effectively surrendered our equity interests in the joint venture. Our involvement in the joint venture remains limited to the unwinding process and is in compliance with applicable sanctions regimes.

We have suspended deliveries to Russia, stopped new business and have moved our limited R&D activities out of Russia. On 12 April 2022, we announced that we would be exiting the Russian market. For humanitarian reasons, Western governments had expressed concerns about the risk of critical telecommunication network infrastructure in Russia failing and emphasized the importance of ensuring the continued flow of information and access to the internet which provides outside perspectives to the Russian people. Therefore, as we exit, we will aim to provide the necessary support to maintain the networks and have applied for the relevant licenses to enable this support in compliance with current sanctions. Accordingly, during the exit, certain transactions may still be conducted between Nokia, Rostelecom PJSC and the joint venture, as well as with other Russian entities, in compliance with applicable sanctions as described in the previous paragraph.

We recognized a provision of EUR 104 million in the first quarter of 2022 in relation to Russia. However, the full impact of the invasion of Ukraine and related hostilities, including the economic sanctions and potential responses to them by Russia, is currently unknown and they could further adversely affect our business, supply chain, suppliers and customers.

Changes in various existing regulations or in their application to current or new technologies, products or telecommunication and technology sectors in general, or emerging new regulation in areas such as security, privacy, digital economy or sustainable finance, may adversely affect our operations and business results.

We develop our products based on existing regulations and technical standards. In case of new technology, we must often rely on our predictions for and interpretation of unfinished technical standards and upcoming or draft regulations or, in certain cases, have products developed in the absence of applicable regulations and standards. Fragmentation of rules, lengthy legislative processes and unpredictability of regulatory changes present a particular challenge. Due in part to this fragmentation, we face a risk in the inability to meet regulatory or market expectations on security and privacy in our products and services, and perceived or actual breaches of our information systems or customer information systems if fault is attributable to Nokia.

An increase in regulation of the digital economy and telecommunications following the European Commission's ambitious Green Deal and Path to Digital Decade could fail to find the right balance between political ambitions and practical considerations, which might negatively affect Nokia and

having a stifling effect on innovation due to strict product liability requirements, limits on the use of data, and extensive due diligence and reporting requirements. From a spectrum policy perspective, unrealistic spectrum pricing, failure to enable access to additional spectrum in various bands and/or failure to achieve frequency band harmonization could also adversely impact Nokia's customers and Nokia itself.

Changes in applicable privacy-related regulatory frameworks, such as EU General Data Protection Regulation, the upcoming EU eEvidence and e-Privacy Regulations and similar regulations in other countries or their application may adversely affect our business, including possible changes that increase costs, limit or restrict possibilities to offer products or services, or reduce or could be seen to reduce the privacy aspects of our offerings. For instance, countries could require governmental interception capabilities or issue regulations aimed at allowing direct governmental access to data for the products and services we offer. Such requirements or regulations could adversely affect us, if, among other things, we decide to reduce our sales to such markets or if such requirements or regulations would be limiting our ability to use components, products or software that we have developed or sourced from other companies.

Our current business models and operations rely on certain centralized data processing solutions and cloud or remote delivery-based services for distribution of services and software or data storage, which have certain inherent risks, including those stemming from applicable regulatory regimes, including data protection or data localization, that may cause limitations in implementing such business models or conducting business. An increase in the protectionist stances of governments around the world, which impact the free flow of data across borders, has affected and may further affect our global service delivery model. Furthermore, we observe that enforcement actions and investigations by regulatory authorities related to data security incidents and privacy violations continue to increase. Unauthorized disclosure, transfer or loss of sensitive or confidential data, whether through systems failure, employee negligence, fraud or misappropriation, by us, our vendors or other parties with whom we do business (if they fail to meet the standards we impose) could subject us to significant litigation, monetary damages, regulatory enforcement actions, fines and criminal prosecution in one or more jurisdictions.

We are seeing an increase in climate and other sustainability related regulations and customer requirements globally. In the longer term, such regulations or requirements could impact, for instance, our energy, component and logistic costs or competitiveness of our product offering, as well as affect availability of financing from ESG-focused investors. Emerging regulation coming from the European Union related to Sustainable Finance, such as the EU Taxonomy Regulation and its delegated acts, the new EU Corporate Sustainability Reporting Directive, the EU Corporate Due Diligence Directive will lead to more detailed reporting obligations, controls and documentation requirements and could also affect our ability to work with certain suppliers, as well as have an impact on how our products and sustainability footprint are perceived by the markets. For example, the EU Taxonomy Regulation aims to define rules for which economic activities contribute to sustainability objectives and mandates companies to report the share of their turnover and capital and operating expenses aligned with specified technical criteria. The EU has first focused on the most polluting industries and therefore not all economic activities have yet been considered in the taxonomy work. Currently, the telecom sector is one of the sectors not yet specifically recognized in the EU taxonomy sectors which in turn provide the basis for economic activities. Therefore, the positive impact of our technology on other industries and society is currently not recognized by the EU taxonomy. If this impact remains unrecognized in the EU Taxonomy for too long, or if our offering is not recognized by other similar standards developed around the world, it could potentially have some impact on our financing costs, share price or brand value in the longer term, depending on how such standards are interpreted and used by the markets, financial and investors institutions in the future.

We operate in many jurisdictions around the world, and we are subject to various legal frameworks addressing corruption, fraud, competition, privacy, security, trade policies, environment, human rights, supply chains and other risk areas. At any given time, we may be subject to inspections, investigations, claims, and government proceedings, and the extent and outcome of such proceedings may be difficult to estimate with any certainty. We may be subject to material fines, penalties and other sanctions as a result of such investigations.

Bribery and anti-corruption laws in effect in many countries prohibit companies and their intermediaries from making improper payments to public officials or private individuals for the purpose of obtaining new business, maintaining existing business relationships or gaining any business advantage. Certain anti-corruption laws such as the United States Foreign Corrupt Practices Act (FCPA) also require the maintenance of proper books and records, and the implementation of controls and procedures in order to ensure that a company's operations do not involve corrupt payments. Since we operate throughout the world and given that some of our customers are government-owned entities and that our projects and agreements often require approvals from public officials, there is a risk that our employees, suppliers, consultants or commercial third-party representatives may take actions that are in violation of our compliance policies and of applicable anti-corruption laws.

In many parts of the world where we operate, local practices and customs may be inconsistent with our policies, including the Nokia Code of Conduct, and could violate anti-corruption laws, including the FCPA and the UK Bribery Act 2010, and applicable European Union regulations, as well as applicable economic sanctions, embargoes and applicable competition and privacy laws. Our employees, or other parties acting on our behalf, could violate policies and procedures intended to promote compliance with anti-corruption laws, economic sanctions, competition or privacy laws or other applicable regulations. Violations of these laws by our employees or other parties acting on our behalf, regardless of whether we had participated in such acts or had knowledge of such acts, could result in us or our employees becoming subject to criminal or civil enforcement actions, including fines or penalties, disgorgement of profits and suspension or disqualification of sales. Additionally, violations of law or allegations of violations may result in reputational harm and loss of business and adversely affect our brand and reputation. Detecting, investigating and resolving such situations may also result in significant costs, including the need to engage external advisors, and consume significant time, attention and resources from our management and other key employees. The results and costs of such investigations or claims may be difficult to predict and could lead to, for instance, lengthy disputes, fines, fees or indemnities, costly settlement or the deterioration of the Nokia brand. Furthermore, even without allegations of misconduct against us, our employees or other parties acting on our behalf, we may face loss of business as a result of improper conduct or alleged improper conduct by our competitors.

We may be subject to claims, fines, investigations or assessments for conduct that we failed to or were unable to discover or identify in the course of performing our due diligence investigations of Alcatel-Lucent, including unknown or unasserted liabilities and issues relating to fraud, trade compliance, non-compliance with applicable laws and regulations, improper accounting policies or other improper activities. With the acquisition of Alcatel-Lucent, any historical issues with Alcatel-Lucent's operations may be attributed to or the responsibility of Nokia. In the past, Alcatel-Lucent has experienced both actual and alleged violations of anti-corruption laws. As a result of FCPA violations in the past, Alcatel-Lucent had to pay substantial amounts in fines, penalties and disgorgement of profits to government enforcement agencies in the United States and elsewhere.

Our governance, internal controls and compliance processes could fail to detect errors or wrongdoings and to prevent regulatory penalties at corporate level, in operating subsidiaries and joint ventures.

Nokia is a publicly listed company and, as such, subject to various securities and accounting rules and regulations. For instance, we must monitor and assess our internal control over financial reporting and its compliance with the applicable rules and regulations. A failure of our corporate functions, our business groups, our operating subsidiaries or our joint ventures to maintain effective internal controls over financial reporting, or to comply with the applicable securities and accounting rules and regulations, could adversely affect the accuracy and timeliness of our financial

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reporting, which could result, for instance, in loss of confidence in us or in the accuracy and completeness of our financial reports, or otherwise in the imposition of fines or other regulatory measures, which could have a material adverse effect on us.

Integrity and high ethical standards are an essential part of our culture. However, despite of our Group-wide compliance measures, including ethical business trainings and other actions (including towards our suppliers), we may not be able to prevent breaches of law or governance standards within our business, subsidiaries, joint ventures or in our supply chain. If we fail to or are unable to comply with applicable law and regulations, we could experience penalties and adverse rulings in enforcement and other proceedings.

We are subject to litigation proceedings, which may be disruptive and expensive. In addition, an unfavorable outcome of litigation, arbitrations, agreement-related disputes or product liability-related allegations against our business could have a material adverse effect on us.

We are a party to lawsuits, arbitrations, agreement-related disputes and product liability-related allegations in the normal course of our business. Litigation, arbitration or agreement-related disputes can be expensive, lengthy and disruptive to normal business operations and divert the efforts of our management. Moreover, the outcomes of complex legal proceedings or agreement-related disputes are difficult to predict. An unfavorable resolution of a particular lawsuit, arbitration or agreement-related dispute could have a material adverse effect on us. The investment or acquisition decisions we make may subject us to litigation arising from minority shareholders' actions and investor dissatisfaction with the activities of our business. Shareholder disputes, if resolved against us, could have a material adverse effect on us.

We record provisions for pending claims when we determine that an unfavorable outcome is likely and the loss can reasonably be estimated. Although we believe our provisions for pending claims are appropriate, due to the inherent uncertain nature of legal proceedings, the ultimate outcome or actual cost of settlement may materially differ from estimates.

Although our products are designed to meet all relevant safety standards and other recommendations and regulatory requirements globally, we cannot guarantee we will not become subject to product liability claims or be held liable for such claims, which could have a material adverse effect on us. We have been involved in several lawsuits alleging adverse health effects associated with our products, including those caused by electromagnetic fields, and the outcome of such procedures is difficult to predict, including potentially significant fines or settlements. Even a perceived risk of adverse health effects of mobile devices or base stations could have a material adverse effect on us, for instance, through a reduction in the demand for mobile devices, and a decreased demand for mobile networks or increased difficulty in obtaining sites for base stations.

For a more detailed discussion of litigation to which we are a party, refer to Note 27, Commitments, contingencies and legal matters, of our consolidated financial statements.

We are involved in joint ventures and other affiliated companies with their own governance and system infrastructure and are exposed to risks inherent to companies under joint management or not having direct management control.

We have a number of joint ventures, including those where Nokia is the minority partner, and other affiliated companies with their own governance and system infrastructure where Nokia does not have direct management control. The agreements related to our joint ventures may require unanimous consent or the affirmative vote of a qualified majority of the shareholders to take certain actions, thereby possibly slowing down the decision-making process or impairing our ability to implement our key policies and practices, such as our compliance processes and culture, in a comprehensive or timely manner. In addition, joint venture companies and other affiliated companies having their own governance and system infrastructure, such as our local service companies focusing on networks field services, involve inherent risks such as those associated with a complex corporate governance structure, lack of transparency or uniform controls and procedures and consequent risks of compliance breaches or other similar issues, or issues in dissolving such entities or divesting their shareholdings, assets and liabilities, and also may involve negative public perceptions caused by the joint venture partner that are adverse to us.

We engage in the installation and maintenance of undersea telecommunications cable networks. During this activity, we may cause damage to existing undersea infrastructure, for which we may ultimately be held responsible.

We supply, install and maintain submarine optical fiber cable networks linking mainland to islands, island to island or several points along a coast. Our activities also include the provision of optical fiber infrastructure to oil and gas platforms and other offshore installations. Despite the precautionary measures, there is a risk that previously laid infrastructure, such as third-party fiber optic cables, electrical power lines or hydrocarbon pipelines, may go undetected despite such precautions, and be damaged during the process of laying or maintaining the telecommunications cables. Such an event could potentially cause temporary business interruption to third parties operating in the same area, environmental incidents, safety accidents, unwanted media or regulatory attention, loss of reputation, litigation, repair costs or compensation payments for the affected parties. While we have contractual limitations in place and maintain insurance coverage to limit our exposure, these protections may be insufficient to cover such exposure entirely.

[Financial and tax-related uncertainties](#)

We have operations in many countries with different tax laws and rules, which may result in complex tax issues and disputes.

Taxation or other fees collected by governments or governmental agencies may result in unexpected payment obligations, and in response to prevailing difficult economic conditions in the public sector, coupled with already enacted and proposed fundamental changes in international tax regulations, there may be an increased aggressiveness in collecting such fees or taxes. We may be obliged to pay additional taxes for past periods as a result of changes in law, or changes of tax authority practice or interpretation (possibly with retroactive effect in certain cases), or inaccurate interpretations of tax laws by us resulting potentially in a material adverse effect on our cash flow and financial position. In particular, potential changes in re-allocation of taxing rights and other fundamental international tax principles, the OECD Pillar project and digital business-related initiatives, wide geographical footprint of operations, changes in tax laws or global laws regarding transfer pricing could adversely impact our business, operating results and overall tax burden. There may also be unforeseen tax expenses that turn out to have an unfavorable impact on us, adverse tax consequences related to past acquisitions and divestments, and potential tax liabilities that we are currently not aware of. As a result, and given the inherently unpredictable nature of taxation, our tax rate may change from its current level and our cash flows regarding taxes may not be stable.

As a company with global operations, we are subject to tax investigations in various jurisdictions, and such proceedings can be lengthy, involve actions that can hinder local operations and affect unrelated parts of our business, and the outcome of such proceedings is difficult to predict. While we have made provisions for certain tax issues, the provisions we have made may not be adequate to cover such increases.

In the context of our sale of Devices & Services business to Microsoft, we are required to indemnify Microsoft for certain tax liabilities, including (i) tax liabilities of the Nokia entities acquired by Microsoft in connection with the closing of the sale of Devices & Services business, (ii) tax liabilities associated with the assets acquired by Microsoft and attributable to tax periods ending on or prior to the closing date of the sale of Devices & Services business, and (iii) tax liabilities relating to the pre-closing portion of any taxable period that includes the closing date of the sale of Devices & Services business.

Our actual or anticipated performance, among other factors, could reduce our ability to utilize our tax attributes and deferred tax assets.

Deferred tax assets recognized on tax losses, unused tax credits and tax-deductible temporary differences are dependent on our ability to offset such items against future taxable income within the relevant tax jurisdiction. Such deferred tax assets are also based on our assumptions on future taxable earnings, and these may not be realized as expected which may cause the deferred tax assets to be materially reduced. Any such reduction could have a material effect on us. As an example, Nokia derecognized EUR 2.9 billion deferred tax assets related to Finland in 2020 and re-recognized EUR 2.5 billion of deferred tax assets related to Finland in 2022. Additionally, our earnings have been unfavorably affected in the past, and may continue to be in the future, in the event that no tax benefits are recognized for certain deferred tax items.

We may not have access to sources of funding on favorable terms, or at all.

In periods when the capital and credit markets experience significant volatility, the amounts, sources and cost of capital available to us may be adversely affected. Deteriorating economic conditions or financial uncertainty in any of the markets in which we sell our products could reduce business confidence and adversely impact spending patterns, and thereby could adversely affect the amounts, sources and cost of capital available to us. Our business requires a significant amount of cash and we continue to invest in our R&D and other future capabilities. We rely on multiple sources of funding for short-term and long-term capital and aim to minimize the liquidity risk by maintaining a sufficient cash position and having committed credit lines in place. However, if economic conditions deteriorate or credit market tightens, there can be no assurances that we will be able to generate sufficient amounts of capital or to maintain an efficient capital structure from time to time.

We also may not be able to have access to additional sources of funds that we may need from time to time with reasonable terms, or at all. If we cannot access capital or sell receivables on a commercially viable basis, our business, financial condition and cash flow could materially suffer.

We may not be able to maintain our investment grade credit ratings

Moody's, S&P Global Ratings, Fitch and other credit rating agencies have assigned credit ratings to us. Following the upgrades by Moody's and S&P Global Ratings in February 2023, we have updated our goal from re-establishing investment grade credit ratings to maintaining our investment grade credit ratings. However, there can be no assurances that we will be able to maintain our current investment grade credit ratings.

In the event our credit rating is downgraded, it could have a material adverse effect, for instance on our cost of funds and related margins, our business and results of operations, financial condition, liquidity, or access to capital markets.

Due to our global operations, our net sales, costs and results of operations, as well as the US dollar value of our dividends and market price of our ADSs, are affected by exchange rate fluctuations.

We operate globally and are therefore exposed to foreign exchange risks in the form of both transaction risks and translation risks. Our policy is to monitor and hedge foreign exchange rate exposures within defined exposure identification horizons. We manage our operations to mitigate, but not to eliminate, the impacts of exchange rate fluctuations and our hedging activities may prove unsuccessful in mitigating the potentially negative impact of exchange rate fluctuations. Additionally, significant volatility in the relevant exchange rates and interest rates may increase our hedging costs, as well as limit our ability to hedge our exchange rate exposures including, in particular certain emerging market currencies. Furthermore, exchange rate fluctuations may have an adverse effect on our net sales, costs and results of operations, as well as our competitive position, through their impact on our customers, suppliers and competitors.

We also experience other financial market-related risks, including changes in interest rates and in prices of marketable securities that we own. We may use derivative financial instruments to reduce certain of these risks. If our strategies to reduce such risks are not successful, our financial condition and results of operations may be harmed.

Additionally, exchange rate fluctuations may materially affect the US dollar value of any dividends or other distributions that are paid in euro, as well as the market price of our ADSs.

Our pension and other post-employment benefit obligations are subject to numerous factors that could result in a need for increased funding, adversely affecting our results of operations and cash flow.

We are exposed to various employee cost-related risks, including those related to pension, and post-employment healthcare and life insurance cost-related risks. In the US, we maintain significant employee pension benefit plans and a significant retiree welfare benefit plan (providing post-employment healthcare benefits and post-employment life insurance coverage). Outside the US, we contribute to pension schemes for large numbers of current and former employees. The US and non-US plans and schemes have funding requirements that depend on, among other things, various legal requirements, how assets set aside to pay for those obligations are invested, the performance of financial markets, interest rates, assumptions regarding the life expectancy of covered employees and retirees, and medical cost inflation and medical care utilization. To the extent that any of those variables change, the funding required for those plans/schemes may increase adversely affecting our results of operations and cash flow.

With respect to our other post-employment benefit obligations in the US, we face the following additional risks:

- we currently fund, and expect to be able to continue to fund, our US post-employment healthcare and group life insurance costs for our formerly represented retirees through transfers of excess pension assets from our (U.S.) formerly represented pension plan, as permitted under Section 420 of the U.S. Internal Revenue Code. Section 420 currently provides that no transfers of excess pension assets may be made after 31 December 2032; and
- we currently provide post-employment group life insurance coverage for a closed group of former non-represented employees who meet stated age and service criteria. This benefit obligation is largely insured through an experience-rated group life insurance policy issued by a reputable insurer, the premiums for which are paid from a voluntary employees' beneficiary association (veba) trust. Based on current actuarial and return-on-asset assumptions and the present level and structure of this group life insurance obligation, we believe that we can continue to fund the premiums for this policy from the veba trust and from transfers of excess pension assets from our (U.S.) non-represented pension plan, as permitted under Section 420 of the U.S. Internal Revenue Code. As noted above, Section 420 currently provides that no transfers of excess pension assets may be made after 31 December 2032.

The carrying amount of our goodwill may not be recoverable.

We assess the carrying amount of goodwill annually, or more frequently if events or changes in circumstances indicate that such carrying amount may not be recoverable. We assess the carrying amount of other identifiable assets if events or changes in circumstances indicate that their carrying amounts may not be recoverable, for instance, if we would not generate revenues from our businesses as anticipated, or if our businesses would not generate sufficient positive operating cash flows. These, or other factors, may lead to a decrease in the value of our assets, including intangible assets and the goodwill attributed to our businesses, resulting in impairment charges that may adversely affect our net profit for the year. While we believe the estimated recoverable values are reasonable, actual performance in the short and long term and our assumptions on which

we base our calculations could materially differ from our forecasts, which could impact future estimates of our businesses' recoverable values, and may result in impairment charges.

Risks associated with ownership of our shares

The amount of dividend and/or repayment of capital and other profit distributions such as share buybacks to shareholders for each financial period is uncertain.

As announced on 26 January 2023, our Board proposes to the Annual General Meeting to be authorized to decide in its discretion on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity in respect of financial year 2022. Furthermore, our Board initiated a share buyback program, under the authorizations granted by Nokia's Annual General Meetings on 8 April 2021 and 5 April 2022, to return up to EUR 600 million of cash to shareholder in tranches over a period of two years. The first phase of the share buyback program with a maximum aggregate purchase price of EUR 300 million started on 14 February 2022 and ended on 11 November 2022. The second EUR 300 million phase of the share buyback program started on 2 January 2023 and it will end at the latest by 21 December 2023. The Annual General Meeting decided on 5 April 2022 that no dividend is distributed by a resolution of the Annual General Meeting and authorized the Board of Directors to resolve in its discretion on the distribution of an aggregate maximum of EUR 0.08 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity. The authorization is valid until the opening of the next Annual General Meeting, and it can be used to distribute assets in four installments during the validity of the authorization, unless the Board decides otherwise for a justified reason. We cannot assure that we will distribute dividends and/or capital repayments on the shares issued by us, nor is there any assurance as to the amount of any dividend and/or repayment of capital we may pay, including but not limited to situations where we make commitments to increase our dividends. Neither can we guarantee that we finalize the announced share buyback program. The payment and the amount of any dividend and/or repayment of capital as well as additional share buyback programs is subject to the discretion of the general meeting of our shareholders and our Board, and will depend on available cash balances, expected cash flow generation, anticipated cash needs, retained earnings, the results of our operations and our financial condition and terms of outstanding indebtedness, as well as other relevant factors such as restrictions, prohibitions or limitations imposed by applicable laws. Further, even if any conditions or factors covering the issuance or distribution of dividends are met, the Board or the shareholders have in the past decided, and may going forward decide, not to issue or distribute dividends or initiate additional buyback programs.

Our share and/or ADS price may be volatile and subject to fluctuations.

Our share and/or ADS price may be volatile and could be subject to fluctuations in response to various factors, some of which are beyond our control. In addition to the factors described in this section, Risk Factors, other factors that could cause fluctuations in our share price include, among others, high volatility in the securities markets generally and volatility in telecommunications and technology companies' securities in particular, trading volumes, speculation in the media or retail or institutional investment communities regarding the company and our prospects, future developments in our industry and competitors, our financial results and the expectations of financial analysts, as well as the timing or content of any public communications, including reports of operating results, by us or our competitors. Further, factors in the public trading market for our stock may produce price movements that may or may not comport with macro, industry or company-specific fundamentals, including, without limitation, the sentiment of retail investors (including as may be expressed on financial trading and other social media sites and online forums), the direct access by retail investors to broadly available trading platforms, the amount and status of short interest in our securities, access to margin debt, trading in options and other derivatives on our common stock and any related hedging and other trading factors.

The market price of, and trading volume for, our shares and/or ADSs may change for reasons not necessarily related to our actual operating performance. The capital markets have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. In addition, in the past, following periods of volatility in the market price of a company's securities, stockholders often institute securities class action litigation against that company. This type of litigation could result in substantial costs and divert our management's attention and resources, which could have a material adverse effect on our cash flows, our ability to execute our business strategy and our ability to make distributions to our stockholders.

Non-Finnish shareholders are likely required to provide detailed information to obtain advantageous withholding tax treatment for dividends.

As described in more detail under General facts on Nokia—Taxation section, non-Finnish shareholders are required to provide certain information in order to benefit from the reduced dividend withholding tax rates set out in the applicable tax treaties. Furthermore, custodians are required to fulfill certain strict requirements and take over certain responsibilities and assume liability for incorrectly applied withholding tax, or a higher withholding tax rate will apply. Such requirements will likely impose an additional administrative burden on shareholders or result in the higher withholding rate becoming applicable for non-Finnish shareholders.

Significant subsequent events

Offer to purchase outstanding notes

On 9 February 2023, Nokia announced that it commenced an offer to purchase the outstanding EUR 750 million 2.00% notes due 15 March 2024 (the "2024 Notes"), EUR 500 million 2.375% notes due 15 May 2025 (the "2025 Notes") and EUR 750 million 2.00% notes due 11 March 2026 (the "2026 Notes"), up to a maximum cash consideration of EUR 700 million (the "Tender Offer"). The purpose of the Tender Offer is to manage the overall indebtedness of Nokia and to extend Nokia's debt maturity profile in an efficient manner.

On 16 February 2023, the Tender Offer expired. Nokia accepted tenders for EUR 372 million (49.66% of the nominal amount) of the 2024 Notes, EUR 208 million (41.57% of the nominal amount) of the 2025 Notes and EUR 120 million (15.96 % of the nominal amount) of the 2026 Notes. The Tender Offer was settled on 21 February 2023.

New euro-denominated notes

On 21 February 2023, Nokia issued EUR 500 million 4.375% sustainability-linked Notes due August 2031 under its 5 billion Euro Medium-Term Note Programme. The proceeds of the new notes are intended to fund the Tender Offer and for general corporate purposes.

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American Depositary Shares

Fees and charges

ADS holders may have to pay the following service fees to the Depositary:

Service	Fees, USD
Issuance of ADSs	Up to 5 cents per ADS ⁽¹⁾
Cancellation of ADSs	Up to 5 cents per ADS ⁽¹⁾
Distribution of cash dividends or other cash distributions	Up to 2 cents per ADS
Distribution of ADSs pursuant to (i) stock dividends, free stock distributions or (ii) exercises of rights to purchase additional ADSs	Up to 5 cents per ADS
Distribution of securities other than ADSs or rights to purchase additional ADSs	Up to 5 cents per ADS ⁽¹⁾
ADS transfer fee	1.50 cents per transfer ⁽¹⁾

(1) These fees are typically paid to the Depositary by the brokers on behalf of their clients receiving the newly issued ADSs from the Depositary and by the brokers on behalf of their clients delivering the ADSs to the Depositary for cancellation. The brokers in turn charge these transaction fees to their clients.

Additionally, ADS holders are responsible for certain fees and expenses incurred by the Depositary on their behalf and certain governmental charges such as taxes and registration fees, transmission and delivery expenses, conversion of foreign currency and fees relating to compliance with exchange control regulations. The fees and charges may vary over time.

In the event of refusal to pay the depositary fees, the Depositary may, under the terms of the deposit agreement, refuse the requested service until payment is received or may set off the amount of the depositary fees from any distribution to be made to the ADS holder.

Payments

In 2022, our Depositary made the following payments on our behalf in relation to our ADS program.

Category	Payment, USD
Settlement infrastructure fees (including the Depositary Trust Company fees)	979 285.63
Proxy process expenses (including printing, postage and distribution)	2 024 077.29
ADS holder identification expenses	31 254.95
Legal fees	-
NYSE listing fees	500 000.00
Investor relations expenses	17 418.20
Total	3 552 036.07

Additionally for 2022, our Depositary reimbursed us USD 9 000 000 mainly related to contributions towards our investor relations activities, including investor meetings and conferences and fees of investor relations service vendors, and other miscellaneous expenses related to the United States listing of our ADSs.

Controls and procedures

Our management, with the participation of our President and CEO and our Chief Financial Officer, conducted an evaluation pursuant to Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act), of the effectiveness of our disclosure controls and procedures at 31 December 2022. Based on such evaluation, our President and CEO and our Chief Financial Officer have concluded that our disclosure controls and procedures were effective.

Disclosure controls and procedures mean controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms, and that such information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our President and CEO and our Chief Financial Officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosures.

Management's annual report on internal control over financial reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for Nokia. Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation and fair presentation of published financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management evaluated the effectiveness of our internal control over financial reporting using the criteria described in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, our management has assessed the effectiveness of Nokia's internal control over financial reporting at 31 December 2022 and concluded that such internal control over financial reporting is effective.

The effectiveness of our internal control over financial reporting at 31 December 2022 has been audited by Deloitte Oy, an independent registered public accounting firm. Refer to section "Reports of independent registered public accounting firm".

Changes in internal control over financial reporting

There have been no changes in our internal control over financial reporting during 2022 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Attestation report of the registered public accounting firm

Refer to section "Reports of independent registered public accounting firm".

Exchange controls

There are currently no Finnish laws that may affect the import or export of capital, or the remittance of dividends, interest or other payments.

Government regulation

Nokia and its businesses are subject to direct and indirect regulation in each of the countries in which we and our customers do business. As a result, changes in or uncertainties related to various types of regulations applicable to current or new technologies, intellectual property, products, services, company operations and business environment (e.g. labor laws, taxation) could affect our business adversely. Moreover, the implementation of technological or legal requirements could impact our products and services, technology and patent licensing activities, manufacturing and distribution processes, and could affect the timing of product and services introductions and the cost of our production, products and services, as well as their commercial success. Also, our business is subject to the impacts of changes in economic and trade policies. Export control, tariffs or other fees or levies imposed on our products and services, environmental, product safety and security and other regulations that adversely affect the export, import, pricing or costs of our products and services as well as export prohibitions (sanctions) enacted by the EU, the United States or other countries or regions could adversely affect our net sales and results of operations. Further, potential governmental intervention in supply chain (e.g. prohibiting imports from certain geographies or imposing certain criteria on selection of suppliers) may impact Nokia's operations.

For example, depending on the geography, our products and services are subject to a wide range of government regulations that might have a direct impact on our business, including, but not limited to, regulation related to product certification, standards, spectrum management, provision of telecommunications services, privacy and data protection, competition and sustainability. The EU-level or local member state regulation has a direct impact on many areas of our business, markets and customers within the EU. The European regulation influences, for example, conditions for innovation for telecommunications infrastructure and internet and related services, as well as technology and patent licensing; investment in fixed and wireless broadband communication infrastructure and operation of global data flows. Additionally, with respect to certain developing market countries, the business environment we operate in can be affected by localization requirements.

We proactively exchange views and address the impact of any planned changes to the regulatory environment on our business activities with state agencies, regulators and other decision-makers either through our government relations representatives in various geographies and through our experts, or indirectly through memberships in industry associations.

Sales in United States-sanctioned countries

General

We are a global company and have sales in most countries of the world. Nokia is committed to the highest standards of ethical conduct, and adheres to all applicable national and international trade-related laws. As a leading international telecommunications company with global operations, Nokia has a presence also in countries subject to international sanctions. All operations of Nokia, and in particular any operations undertaken in countries targeted by sanctions, are conducted in accordance with our comprehensive and robust internal compliance program to ensure that they are in full compliance with all applicable laws and regulations. In addition, we continuously monitor international developments and assess the appropriateness of our presence and business in these, and all, markets. Nevertheless, business in these markets is marked by complexity and uncertainty.

We cannot exclude the possibility that third parties may unlawfully divert our products to these countries from other countries in which we sell them, or that, for services distributed through the internet, third parties could have accessed them in markets or countries for which they are not intended by circumventing the industry standard protective mechanisms, such as IP address blocks, despite our efforts in implementing measures to prevent such actions.

Disclosure pursuant to Section 219 of the Iran Threat Reduction and Syria Human Rights Act of 2012

We operate in Iran in compliance with applicable economic sanctions and other trade-related laws. We provide telecommunications equipment with ancillary services to network operator customers and internet service providers. We do not deliver equipment and services to Iran for military purposes, or for the purpose of limiting political discourse, blocking legitimate forms of free speech or conducting surveillance of individuals.

In connection with the business activities relating to Iran, we have two local offices in Iran that employed approximately 10 employees at the end of 2022 through a branch of a Finnish subsidiary. Nokia is the controlling shareholder in Pishahang Communications Network Development Company (Pishahang). The other minority shareholder in Pishahang is Information Technology Application Development TACFAM Company (Tacfam).

We continue to maintain routine contacts with governmental agencies in Iran as required, for example, to maintain a legal presence and office facilities in Iran, pay taxes and employ Iranian nationals.

To our knowledge, none of our sales in Iran in 2022 are required to be disclosed pursuant to ITRA Section 219, with the possible exception of the following.

In 2022, we continued only with our existing contractual obligations in compliance with applicable economic sanctions and other trade-related laws including limited local delivery of radio products and transmission licenses, including associated services, to MTN Irancell.

Although it is difficult to evaluate with any reasonable degree of certainty, we have concluded that we cannot exclude the possibility that MTN Irancell or Tacfam is owned or controlled, directly or indirectly, by the government of Iran. None of these activities involve US affiliates of Nokia, or any persons from the United States.

Nokia does not normally allocate net profit on a country-by-country or activity-by-activity basis, other than as set forth in Nokia's consolidated financial statements prepared in accordance with IFRS. Therefore, for this exercise Nokia will reflect its sales margin in lieu of the net profit/loss. In 2022 we recognized net sales of EUR 2 million from business with MTN Irancell. Sales margin from this customer amounted to 70%.

Although we evaluate our business activities on an ongoing basis, we intend to continue not accepting any new business in Iran in 2023 and intend to only complete existing contractual obligations in Iran in compliance with applicable economic sanctions and other trade-related laws.

Taxation

General

The statements of the United States and Finnish tax laws set out below are based on the laws in force as of the date of this report and may be subject to any changes in US or Finnish law, and in any double taxation convention or treaty between the United States and Finland, occurring after that date, possibly with retroactive effect.

For purposes of this discussion, "US Holders" are beneficial owners of ADSs that: (i) hold the ADSs as capital assets; (ii) are citizens or residents of the United States, corporations created in or organized under US law, estates whose income is subject to US federal income tax, or trusts that elect to be treated as a US person or are both subject to the primary supervision of a US court and controlled by a US person; and (iii) in each case, are considered residents of the United States for purposes of the current income tax convention between the United States and Finland, referred to as the "Treaty", and the limitation on benefits provisions therein. Special rules apply to US Holders that are also residents of Finland and to citizens or residents of the United States that do not maintain a substantial presence, permanent home or habitual abode in the United States. For purposes of this discussion, it is assumed that the Depositary and its custodian will perform all actions as required by the deposit agreement with the Depositary and other related agreements between the Depositary and Nokia.

If a partnership holds ADSs (including for this purpose any entity or arrangement treated as a partnership for US federal income tax purposes), the tax treatment of a partner will depend upon the status of the partner and activities of the partnership. If a US Holder is a partnership or a partner in a partnership that holds ADSs, the holder is urged to consult its own tax advisor regarding the specific tax consequences of owning and disposing of its ADSs.

Because this summary is not exhaustive of all possible tax considerations - such as situations involving financial institutions, banks, tax-exempt entities, pension funds, US expatriates, real estate investment trusts, persons that are dealers in securities, persons who own (directly, indirectly or by attribution) 10% or more of the share capital or voting stock of Nokia, persons who acquired their ADSs pursuant to the exercise of employee stock options or otherwise as compensation, or US Holders whose functional currency is not the US dollar, who may be subject to special rules that are not discussed herein - holders of shares or ADSs that are US Holders are advised to satisfy themselves as to the overall US federal, state and local tax consequences, as well as to the overall Finnish and other applicable non-US tax consequences, of their ownership of ADSs and the underlying shares by consulting their own tax advisors. This summary does not discuss the treatment of ADSs that are held in connection with a permanent establishment or fixed base in Finland, and it does not address the US Medicare tax on certain investment income.

For the purposes of both the Treaty and the US Internal Revenue Code of 1986, as amended, referred to as the "Code", US Holders of ADSs will be treated as the owners of the underlying shares that are represented by those ADSs. Accordingly, the following discussion, except where otherwise expressly noted, applies equally to US Holders of ADSs, on the one hand, and to shares on the other.

The holders of ADSs will, for Finnish tax purposes, be treated as the owners of the shares that are represented by the ADSs. The Finnish tax consequences to the holders of shares, as discussed below, also apply to the holders of ADSs.

US taxation of cash dividends

For US federal income tax purposes, the gross amount of dividends paid to US Holders of shares or ADSs out of our current or accumulated earnings and profits, including any related Finnish withholding tax, generally will be included in gross income as foreign source dividend income. We do not expect to maintain calculations of our earnings and profits under US federal income tax principles; therefore, US Holders should expect that the entire amount of any distribution generally will be reported as dividend income. Dividends will not be eligible for the dividends received deduction allowed to corporations under the Code. The amount includible in income (including any Finnish withholding tax) will equal the US dollar value of the payment, determined at the time such payment is received by the Depositary (in the case of ADSs) or by the US Holder (in the case of shares), regardless of whether the payment is in fact converted into US dollars. Generally, any gain or loss resulting from currency exchange rate fluctuations during the period between the time such payment is received and the date the dividend payment is converted into US dollars will be treated as US source ordinary income or loss to a US Holder.

Special rules govern and specific elections are available to accrual method taxpayers to determine the US dollar amount includible in income in the case of a dividend paid (and taxes withheld) in foreign currency. Accrual basis taxpayers are urged to consult their own tax advisors regarding the requirements and elections applicable in this regard.

Dividends received generally will constitute foreign source "passive category income" for foreign tax credit purposes. Subject to certain limitations, Finnish taxes withheld may be eligible for credit (not in excess of the applicable Treaty rate) against a US Holder's US federal income tax liability. Additionally, if Nokia makes a distribution from its SVOP-reserve (discussed below) when it does not have current or accumulated earnings and profits, a US Holder may not be able to claim such credit.

In lieu of a credit, a US Holder may elect to claim a deduction in respect of its Finnish income taxes provided the deduction is claimed for all of the foreign taxes paid by the US Holder in that particular taxable year. A deduction does not reduce US tax on a dollar-for-dollar basis like a tax credit. The deduction, however, is not subject to the limitations applicable to foreign tax credits.

Provided that certain holding period and other requirements are met, individuals and certain other non-corporate US Holders are eligible for reduced rates of US federal income tax at a maximum rate of 20% in respect of "qualified dividend income". Dividends that Nokia pays with respect to its shares and ADSs generally will be qualified dividend income if certain holding periods are met and Nokia was neither a passive foreign investment company (PFIC) in the taxable year prior to the year in which the dividend was paid nor in the taxable year in which the dividend is paid. Nokia currently believes that dividends it pays with respect to its shares and ADSs will constitute qualified dividend income for US federal income tax purposes; however, this is a factual matter and is subject to change. Nokia anticipates that its dividends will be reported as qualified dividends on Forms 1099-DIV delivered to US Holders. US Holders of shares or ADSs are urged to consult their own tax advisors regarding the availability to them of the reduced dividend tax rate in light of their own particular situation and the computations of their foreign tax credit limitation with respect to any qualified dividends paid to them, as applicable.

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We believe we should not be classified as a PFIC for US federal income tax purposes for the taxable year ended 31 December 2022 and we do not expect to become a PFIC in the foreseeable future. US Holders are advised, however, that this conclusion is a factual determination that must be made annually and thus may be subject to change. If we were to be classified as a PFIC, the tax on distributions on our shares or ADSs and on any gains realized upon the disposition of our shares or ADSs generally would be less favorable than as described herein. Dividends paid by a PFIC are not "qualified dividend income" and are not eligible for reduced rates of taxation. Additionally, US persons who are shareholders in a PFIC generally will be required to file an annual report disclosing the ownership of such shares and certain other information. US Holders should consult their own tax advisors regarding the application of the PFIC rules, including the related reporting requirements, to their ownership of our shares or ADSs.

[Finnish withholding taxes on cash dividends](#)

Under the Finnish Income Tax Act and Act on Taxation of Non-residents' Income, non-residents of Finland are generally subject to a withholding tax at a rate of 30% on dividends paid by a Finnish resident company. Further, under the Finnish Prepayment Act, 50% preliminary tax must be withheld on dividends paid in certain situations. However, pursuant to the Treaty, dividends paid to US Holders are generally subject to Finnish withholding tax at reduced rates.

Under the Finnish Income Tax Act and tax court practice, the distribution of funds from reserves for invested unrestricted equity (an "SVOP-reserve") by a listed company such as Nokia is taxed as a distribution of a dividend.

As of 1 January 2021, nominee registered shares are generally subject to a withholding tax at a rate of 35% on dividends paid by Nokia. This new withholding tax regime is based on OECD's TRACE (Treaty Relief and Compliance Enhancement) model. Under the new rules, the 35% withholding tax will generally be applied on dividend distributions on nominee registered shares by listed companies such as Nokia, unless custodians fulfill certain strict requirements and are willing to take over certain responsibilities (e.g. registration with the Finnish Tax Administration (so-called authorized intermediary), identification of the beneficial owner of the dividend and collecting and submitting detailed recipient information to the Finnish Tax Administration using specific filing procedures). Furthermore, application of reduced withholding tax rates at source require that the custodian and dividend distributor are willing to assume liability of incorrectly applied withholding tax. If the custodian only registers with the Finnish Tax Administration and submits (or undertakes to submit) the detailed recipient details to the Finnish Tax Administration, 30% withholding tax rate can be applied, instead of 35%.

Any tax withheld in excess can be reclaimed after the calendar year of the dividend payment by submitting a refund application to the Finnish Tax Administration no later than by the end of the third calendar year following the dividend payment year. During the year of dividend payment, the refund can be processed if custodians and dividend distributor fulfill the above-mentioned requirements laid down for actual dividend distribution.

It is exceptionally also possible that any tax not withheld at source is later assessed directly to the shareholder by the Finnish Tax Administration, in case the failure to withhold tax at source is not due to negligence of the custodian or the dividend distributor.

Holders of shares or ADSs are urged to consult their own custodian regarding the availability of reduced withholding tax rates in light of their own particular situation and approach their custodian in terms of their responsibilities, as well as consult their own tax advisors regarding the availability to them of the tax credit from dividend withholding tax.

[US and Finnish tax on sale or other disposition](#)

A US Holder generally will recognize taxable capital gain or loss on the sale or other disposition of ADSs in an amount equal to the difference between the US dollar value of the amount realized and the adjusted tax basis (determined in US dollars) in the ADSs. If the ADSs are held as a capital asset, this gain or loss generally will be long-term capital gain or loss if, at the time of the sale, the ADSs have been held for more than one year. Any capital gain or loss, for foreign tax credit purposes, generally will constitute US source gain or loss. In the case of a US Holder that is an individual, long-term capital gain generally is subject to US federal income tax at preferential rates. The deductibility of capital losses is subject to significant limitations.

The deposit or withdrawal by a US Holder of shares in exchange for ADSs or of ADSs for shares under the deposit agreement generally will not be subject to US federal income tax or Finnish income tax.

The sale by a US Holder of the ADSs or the underlying shares, other than an individual who, by reason of his residence in Finland for a period exceeding six months, is or becomes liable for Finnish income tax according to the relevant provisions of Finnish tax law, generally will not be subject to income tax in Finland, in accordance with Finnish tax law and the Treaty.

[Finnish transfer tax](#)

The transfer of our shares and ADSs for cash through a broker or other appropriate intermediary is generally not subject to Finnish transfer tax. Non-brokered transfers will generally be exempted from the transfer tax if the transferee has been approved as a trading party in the market where the transfer is executed, or other conditions are met. Transfers of ADSs on the New York Stock Exchange are exempt. Where the transfer does not fulfill the above requirements, and either the buyer or the seller is a Finnish resident or a Finnish branch office of a specified foreign financial service provider, the buyer is liable to pay transfer tax of 1.6% of the transaction price where the resulting tax is at least EUR 10. Selling shareholders should consult their tax advisors regarding the specific tax considerations of a sale of our shares or ADSs.

[Finnish inheritance and gift taxes](#)

A transfer of an underlying share by gift or by reason of the death of a US Holder and the transfer of an ADS are not subject to Finnish gift or inheritance tax provided that none of the deceased person, the donor, the beneficiary of the deceased person or the recipient of the gift is resident in Finland.

[Non-residents of the United States](#)

Beneficial owners of ADSs that are not US Holders will not be subject to US federal income tax on dividends received with respect to ADSs unless such dividend income is effectively connected with the conduct of a trade or business within the United States. Similarly, non-US Holders generally will not be subject to US federal income tax on any gain realized on the sale or other disposition of ADSs, unless (a) the gain is effectively connected with the conduct of a trade or business in the United States or (b) in the case of an individual, that individual is present in the United States for 183 days or more in the taxable year of the disposition and other conditions are met.

The United States information reporting and backup withholding

Dividend payments with respect to shares or ADSs and proceeds from the sale or other disposition of shares or ADSs may be subject to information reporting to the Internal Revenue Service and possible US backup withholding. Backup withholding will not apply to a holder if the holder furnishes a correct taxpayer identification number or certificate of foreign status and makes any other required certification in connection therewith, or if it is a recipient otherwise exempt from backup withholding (such as a corporation). Any US persons required to establish their exempt status generally must furnish a duly completed IRS Form W-9 (Request for Taxpayer Identification Number and Certification). Non-US holders generally are not subject to US information reporting or backup withholding. However, such holders may be required to provide certification of non-US status (generally on IRS Form W-8BEN for individuals and Form W-8BEN-E for corporations) in connection with payments received in the United States or through certain US-related financial intermediaries. Backup withholding is not an additional tax. Amounts withheld as backup withholding may be credited against a holder's US federal income tax liability, and the holder may obtain a refund of any excess amounts withheld under the backup withholding rules by timely filing the appropriate claim for refund with the Internal Revenue Service and furnishing the proper required information.

Key ratios

Earnings per share (basic)

Profit/(loss) attributable to equity holders of the parent

Weighted average number of shares outstanding during the year

Earnings per share (diluted)

Profit/(loss) attributable to equity holders of the parent adjusted for the effect of dilution

Adjusted weighted average number of shares during the year

P/E ratio

Closing share price at 31 December

Earnings per share (basic) for continuing operations

Payout ratio

Proposed dividend per share

Earnings per share (basic) for continuing operations

Dividend yield %

Proposed dividend per share

Closing share price at 31 December

Shareholders' equity per share

Capital and reserves attributable to equity holders of the parent

Number of shares at 31 December - number of treasury shares at 31 December

Market capitalization

(Number of shares at 31 December - number of treasury shares at 31 December) x closing share price at 31 December

Share turnover %

Number of shares traded during the year

Average number of shares during the year

Alternative performance measures

Certain financial measures presented in this report are not measures of financial performance, financial position or cash flows defined in IFRS. As these measures are not defined in IFRS, they may not be directly comparable with financial measures used by other companies, including those in the same industry. The primary rationale for presenting these measures is that the management uses these measures in assessing the financial performance of Nokia and believes that these measures provide meaningful supplemental information on the underlying business performance of Nokia. These financial measures should not be considered in isolation from, or as a substitute for, financial information presented in compliance with IFRS.

In 2022 Nokia replaced its performance measures (i) Total cash and current financial investments ("total cash") and (ii) Net cash and current financial investments ("net cash") with (i) Total cash and interest-bearing financial investments ("total cash") and (ii) Net cash and interest-bearing financial investments ("net cash"), respectively. The definitions of these performance measures were updated accordingly to reflect the changes made to Nokia's consolidated statement of financial position. The purposes for using these measures, as stated below, did not change. The modifications to the performance measures were made as during 2022 Nokia commenced investing in highly liquid corporate bonds that are primarily classified as non-current interest-bearing financial investments based on their initial maturity. The comparative amounts for total cash and net cash did not change.

Return on capital employed %

Definition

Return on capital employed is defined as Profit before tax + Interest expense on interest-bearing liabilities / Average capital and reserves attributable to equity holders of the parent + average non-controlling interests + average interest-bearing liabilities.

Purpose

Return on capital employed indicates how efficiently Nokia uses its capital to generate profits.

Composition of return on capital employed %:

EURm	2022	2021	2020
Profit before tax	2 184	1 926	743
Interest expense on interest-bearing liabilities	103	113	127
Total	2 287	2 039	870
Average capital and reserves attributable to equity holders of the parent ⁽¹⁾	19 347	14 913	13 895
Average non-controlling interests ⁽¹⁾	98	91	78
Average interest-bearing liabilities ⁽¹⁾	4 565	5 115	4 927
Total capital employed	24 010	20 119	18 900
Return on capital employed %	9.5%	10.1%	4.6%

(1) Calculated as the average of opening and closing balance for the year as presented in the consolidated statement of financial position. Refer to the consolidated financial statements.

Return on shareholders' equity %

Definition

Return on shareholders' equity is defined as Profit/(loss) for the year attributable to equity holders of the parent / Average capital and reserves attributable to equity holders of the parent.

Purpose

Return on shareholders' equity indicates how efficiently Nokia uses the capital invested by its shareholders to generate profits.

Composition of return on shareholders' equity %:

EURm	2022	2021	2020
Profit/(loss) for the year attributable to equity holders of the parent	4 250	1 623	(2 523)
Average capital and reserves attributable to equity holders of the parent ⁽¹⁾	19 347	14 913	13 895
Return on shareholders' equity %	22.0%	10.9%	(18.2)%

(1) Calculated as the average of opening and closing balance for the year as presented in the consolidated statement of financial position. Refer to the consolidated financial statements.

Equity ratio %

Definition

Equity ratio % is defined as Total capital and reserves attributable to equity holders of the parent + non-controlling interests / Total assets.

Purpose

Equity ratio indicates the proportion of assets financed by the capital provided by the equity holders of the parent to total assets of Nokia.

Composition of equity ratio %:

EURm	2022	2021	2020
Total capital and reserves attributable to the equity holders of the parent	21 333	17 360	12 465
Non-controlling interests	93	102	80
Shareholders' equity	21 426	17 462	12 545
Total assets	42 943	40 049	36 191
Equity ratio %	49.9%	43.6%	34.7%

Total cash and interest-bearing financial investments

Definition

Total cash and interest-bearing financial investments consist of cash and cash equivalents, current interest-bearing financial investments and non-current interest-bearing financial investments.

Purpose

Total cash and interest-bearing financial investments is used to indicate funds available to Nokia to run its current and invest in future business activities as well as provide return for security holders.

Composition of total cash and interest-bearing financial investments:

EURm	2022	2021	2020
Cash and cash equivalents	5 467	6 691	6 940
Current interest-bearing financial investments	3 080	2 577	1 121
Non-current interest-bearing financial investments	697	—	—
Total cash and interest-bearing financial investments	9 244	9 268	8 061

Net cash and interest-bearing financial investments

Definition

Net cash and interest-bearing financial investments equals total cash and interest-bearing financial investments less long-term and short-term interest-bearing liabilities.

Purpose

Net cash and interest-bearing financial investments is used to indicate Nokia's liquidity position after cash required to settle the interest-bearing liabilities.

Composition of net cash and interest-bearing financial investments:

EURm	2022	2021	2020
Total cash and interest-bearing financial investments			
Cash and cash equivalents	5 467	6 691	6 940
Current interest-bearing financial investments	3 080	2 577	1 121
Non-current interest-bearing financial investments	697	—	—
Interest-bearing liabilities			
Long-term interest-bearing liabilities	(4 249)	(4 537)	(5 015)
Short-term interest-bearing liabilities	(228)	(116)	(561)
Net cash and interest-bearing financial investments	4 767	4 615	2 485

Net debt to equity (gearing) %

Definition

Net debt to equity (gearing) % is defined as Interest-bearing liabilities less Total cash and interest-bearing financial investments / (Total capital and reserves attributable to the equity holders of the parent + Non-controlling interests).

Purpose

Net debt to equity ratio presents the relative proportion of shareholders' equity and interest-bearing liabilities used to finance Nokia's assets and indicates the leverage of Nokia's business.

Composition of net debt to equity (gearing) %:

EURm	2022	2021	2020
Interest-bearing liabilities			
Long-term interest-bearing liabilities	4 249	4 537	5 015
Short-term interest-bearing liabilities	228	116	561
Total cash and interest-bearing financial investments			
Cash and cash equivalents	(5 467)	(6 691)	(6 940)
Current interest-bearing financial investments	(3 080)	(2 577)	(1 121)
Non-current interest-bearing financial investments	(697)	—	—
Net debt	(4 767)	(4 615)	(2 485)
Total capital and reserves attributable to the equity holders of the parent	21 333	17 360	12 465
Non-controlling interests	93	102	80
Shareholders' equity	21 426	17 462	12 545
Net debt to equity (gearing) %	(22.2)%	(26.4)%	(19.8)%

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Free cash flow

Definition

Free cash flow is defined as Net cash flows from operating activities - purchases of property, plant and equipment and intangible assets (capital expenditures) + proceeds from sale of property, plant and equipment and intangible assets – purchase of non-current financial investments + proceeds from sale of non-current financial investments.

Purpose

Free cash flow is the cash that Nokia generates after net investments to tangible, intangible and non-current financial investments and it represents the cash available for distribution among its security holders. It is a measure of cash generation, working capital efficiency and capital discipline of the business.

Composition of free cash flow:

EURm	2022	2021	2020
Net cash flows from operating activities	1 474	2 625	1 759
Net capital expenditures			
Purchase of property, plant and equipment and intangible assets (capital expenditures)	(601)	(560)	(479)
Proceeds from sale of property, plant and equipment and intangible assets	33	103	13
Purchase of other non-current financial investments	(115)	(77)	(59)
Proceeds from sale of other non-current financial investments	49	277	122
Free cash flow	840	2 368	1 356

Capital expenditure

Definition

Purchases of property, plant and equipment and intangible assets (excluding assets acquired under business combinations).

Purpose

Capital expenditure is used to describe investments in profit-generating activities in the future.

Composition of capital expenditure:

EURm	2022	2021	2020
Purchase of property, plant and equipment and intangible assets	(601)	(560)	(479)
Capital expenditure	(601)	(560)	(479)

Comparable operating profit

Definition

Comparable operating profit excludes intangible asset amortization and other purchase price fair value adjustments, goodwill impairments, restructuring related charges and certain other items affecting comparability.

Purpose

We believe that our comparable operating profit provides meaningful supplemental information to both management and investors regarding Nokia's underlying business performance by excluding certain items of income and expenses that may not be indicative of Nokia's business operating results. Comparable operating profit is used also in determining management remuneration.

Composition of comparable operating profit:

EURm	2022	2021	2020
Operating profit	2 318	2 158	885
Amortization of acquired intangible assets	411	391	407
Restructuring and associated charges	177	263	651
Costs associated with country exit	98	–	–
Impairment and write-off of assets, net of reversals	97	45	241
Settlement of legal disputes	–	(80)	–
Gain on sale of fixed assets	–	(53)	–
Gain on defined benefit plan amendment	–	–	(90)
Other	8	51	(13)
Comparable operating profit	3 109	2 775	2 081

Comparable operating margin %

Definition

Comparable operating margin is defined as Comparable operating profit / Net sales.

Purpose

Comparable operating margin is used as a measure of Nokia's operating profitability as a percentage of net sales excluding intangible asset amortization and other purchase price fair value adjustments, goodwill impairments, restructuring related charges and certain other items affecting comparability.

As with comparable operating profit, we believe that our comparable operating margin provides meaningful supplemental information to both management and investors regarding Nokia's underlying business performance by excluding certain items of income and expenses that may not be indicative of Nokia's business operating results.

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Composition of comparable operating margin:

EURm	2022	2021	2020
Comparable operating profit	3 109	2 775	2 081
Net sales	24 911	22 202	21 852
Comparable operating margin %	12.5%	12.5%	9.5%

Financial statements

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Consolidated income statement

For the year ended 31 December	Notes	2022 EURm	2021 EURm	2020 EURm
Net sales	5, 6	24 911	22 202	21 852
Cost of sales	7	(14 689)	(13 368)	(13 659)
Gross profit		10 222	8 834	8 193
Research and development expenses	7	(4 550)	(4 214)	(4 087)
Selling, general and administrative expenses	7	(3 013)	(2 792)	(2 898)
Other operating income	9	98	443	126
Other operating expenses	7, 9	(439)	(113)	(449)
Operating profit		2 318	2 158	885
Share of results of associated companies and joint ventures	31	(26)	9	22
Financial income	10	86	43	165
Financial expenses	10	(194)	(284)	(329)
Profit before tax		2 184	1 926	743
Income tax benefit/(expense)	11	2 026	(272)	(3 256)
Profit/(loss) for the year from continuing operations		4 210	1 654	(2 513)
Profit/(loss) for the year from discontinued operations		49	(9)	(3)
Profit/(loss) for the year		4 259	1 645	(2 516)
Attributable to:				
Equity holders of the parent		4 250	1 623	(2 523)
Non-controlling interests		9	22	7
Earnings per share attributable to equity holders of the parent	12	EUR	EUR	EUR
Basic				
Continuing operations		0.75	0.29	(0.45)
Profit/(loss) for the year		0.76	0.29	(0.45)
Diluted				
Continuing operations		0.74	0.29	(0.45)
Profit/(loss) for the year		0.75	0.29	(0.45)

The notes are an integral part of these consolidated financial statements.

Consolidated statement of comprehensive income

For the year ended 31 December	Notes	2022 EURm	2021 EURm	2020 EURm
Profit/(loss) for the year		4 259	1 645	(2 516)
Other comprehensive income				
Items that will not be reclassified to profit or loss				
Remeasurements of defined benefit plans		(424)	3 040	624
Income tax related to items that will not be reclassified to profit or loss		77	(755)	(140)
Items that may be reclassified subsequently to profit or loss				
Translation differences		710	1 153	(1 232)
Net investment hedges		(127)	(249)	266
Cash flow and other hedges		83	–	15
Financial assets at fair value through other comprehensive income		(46)	7	47
Other (decrease)/increase, net		(3)	–	3
Income tax related to items that may be reclassified subsequently to profit or loss		(21)	2	25
Other comprehensive income/(loss), net of tax	19	249	3 198	(392)
Total comprehensive income/(loss) for the year		4 508	4 843	(2 908)
Attributable to:				
Equity holders of the parent		4 500	4 814	(2 914)
Non-controlling interests		8	29	6

The notes are an integral part of these consolidated financial statements.

Consolidated statement of financial position

31 December	Notes	2022 EURm	2021 EURm
ASSETS			
Non-current assets			
Goodwill and intangible assets	13	6 930	7 051
Property, plant and equipment	14	2 015	1 924
Right-of-use assets	15	929	884
Investments in associated companies and joint ventures	31	199	243
Non-current interest-bearing financial investments	21, 32	697	–
Other non-current financial investments	21	828	758
Deferred tax assets	11	3 834	1 272
Other non-current financial assets	21, 32	252	325
Defined benefit pension assets	24	6 754	7 740
Other non-current receivables	17	239	255
Total non-current assets		22 677	20 452
Current assets			
Inventories	16	3 265	2 392
Trade receivables	21, 32	5 549	5 382
Contract assets	6, 32	1 203	1 146
Other current receivables	17	934	859
Current income tax assets	11	153	214
Other current financial and firm commitment assets	21, 22, 32	615	336
Current interest-bearing financial investments	21, 32	3 080	2 577
Cash and cash equivalents	21, 32	5 467	6 691
Total current assets		20 266	19 597
Total assets		42 943	40 049
SHAREHOLDERS' EQUITY AND LIABILITIES			
Capital and reserves attributable to equity holders of the parent			
Share capital		246	246
Share premium		503	454
Treasury shares		(352)	(352)
Translation differences		169	(396)
Fair value and other reserves		3 905	4 219
Reserve for invested unrestricted equity		15 487	15 726
Retained earnings/(accumulated deficit)		1 375	(2 537)
Total capital and reserves attributable to equity holders of the parent		21 333	17 360
Non-controlling interests		93	102
Total equity	18	21 426	17 462
Non-current liabilities			
Long-term interest-bearing liabilities	20, 21, 32	4 249	4 537
Long-term lease liabilities	20	858	824
Deferred tax liabilities	11	332	282
Defined benefit pension and post-employment liabilities	24	2 459	3 408
Contract liabilities	6	120	354
Deferred revenue and other non-current liabilities	21, 25	103	436
Provisions	26	622	645
Total non-current liabilities		8 743	10 486
Current liabilities			
Short-term interest-bearing liabilities	20, 21, 32	228	116
Short-term lease liabilities	20	184	185
Other financial and firm commitment liabilities	21, 22, 32	1 038	762
Current income tax liabilities	11	185	202
Trade payables	21, 32	4 730	3 679
Contract liabilities	6	1 977	2 293
Deferred revenue and other current liabilities	21, 25	3 619	3 940
Provisions	26	813	924
Total current liabilities		12 774	12 101
Total liabilities		21 517	22 587
Total shareholders' equity and liabilities		42 943	40 049

The notes are an integral part of these consolidated financial statements.

Consolidated statement of cash flows

For the year ended 31 December	Notes	2022 EURm	2021 EURm	2020 EURm
Cash flow from operating activities				
Profit/(loss) for the year		4 259	1 645	(2 516)
Adjustments, total	28	(446)	1 713	5 267
Change in net working capital ⁽¹⁾				
(Increase)/decrease in receivables		(451)	239	(418)
(Increase)/decrease in inventories		(991)	(48)	553
Decrease in non-interest-bearing liabilities		(401)	(459)	(845)
Cash flows from operations		1 970	3 090	2 041
Interest received		65	41	33
Interest paid	15, 20	(180)	(192)	(35)
Income taxes paid, net		(381)	(314)	(280)
Net cash flows from operating activities		1 474	2 625	1 759
Cash flow from investing activities				
Purchase of property, plant and equipment and intangible assets		(601)	(560)	(479)
Proceeds from sale of property, plant and equipment and intangible assets		33	103	13
Acquisition of businesses, net of cash acquired		(20)	(33)	(104)
Purchase of interest-bearing financial investments		(3 595)	(1 845)	(1 154)
Proceeds from maturities and sale of interest-bearing financial investments		2 397	398	123
Purchase of other non-current financial investments		(115)	(77)	(59)
Proceeds from sale of other non-current financial investments		49	277	122
Foreign exchange hedging of cash and cash equivalents		(38)	(77)	79
Other		10	19	21
Net cash flows used in investing activities		(1 880)	(1 795)	(1 438)
Cash flow from financing activities				
Acquisition of treasury shares	18	(300)	–	–
Proceeds from long-term borrowings	20	8	17	1 595
Repayment of long-term borrowings	20	(2)	(927)	(246)
Proceeds from/(repayment of) short-term borrowings	20	27	(67)	(83)
Payment of principal portion of lease liabilities	15, 20	(217)	(226)	(234)
Dividends paid and other contributions to shareholders	18	(353)	(9)	(149)
Net cash flows (used in)/from financing activities		(837)	(1 212)	883
Translation differences		19	133	(174)
Net (decrease)/increase in cash and cash equivalents		(1 224)	(249)	1 030
Cash and cash equivalents at 1 January		6 691	6 940	5 910
Cash and cash equivalents at 31 December		5 467	6 691	6 940

(1) Net working capital includes both short-term and long-term items.

The consolidated statement of cash flows combines cash flows from both the continuing and the discontinued operations.

In 2022, net cash flows from operating activities and net cash flows used in investing activities include cash inflows of EUR 26 million (EUR 0 million in 2021 and EUR 6 million in 2020) and EUR 29 million (EUR 0 million in 2021 and EUR 7 million in 2020), respectively, related to discontinued operations.

The notes are an integral part of these consolidated financial statements.

Consolidated statement of changes in shareholders' equity

EURm	Notes	Share capital	Share premium	Treasury shares	Translation differences	Fair value and other reserves	Reserve for invested unrestricted equity	Retained earnings/ (Accumulated deficit)	Attributable to equity holders of the parent	Non-controlling interests	Total equity
1 January 2020		246	427	(352)	(372)	1 382	15 607	(1 613)	15 325	76	15 401
Loss for the year								(2 523)	(2 523)	7	(2 516)
Other comprehensive loss	18, 19				(922)	528		3	(391)	(1)	(392)
Total comprehensive loss for the year		–	–	–	(922)	528	–	(2 520)	(2 914)	6	(2 908)
Share-based payments			76						76		76
Excess tax benefit on share-based payments			2						2		2
Settlement of share-based payments			(62)				49		(13)		(13)
Dividends	18								–	(5)	(5)
Acquisition of non-controlling interests								(10)	(10)		(10)
Investment in subsidiary by non-controlling interest									–	2	2
Other movements					(1)				(1)	1	–
Total transactions with owners		–	16	–	(1)	–	49	(10)	54	(2)	52
31 December 2020		246	443	(352)	(1 295)	1 910	15 656	(4 143)	12 465	80	12 545
Profit for the year								1 623	1 623	22	1 645
Other comprehensive income	18, 19				899	2 309		(17)	3 191	7	3 198
Total comprehensive income for the year		–	–	–	899	2 309	–	1 606	4 814	29	4 843
Share-based payments			108						108		108
Settlement of share-based payments			(97)				70		(27)		(27)
Dividends	18								–	(7)	(7)
Total transactions with owners		–	11	–	–	–	70	–	81	(7)	74
31 December 2021		246	454	(352)	(396)	4 219	15 726	(2 537)	17 360	102	17 462
Profit for the year								4 250	4 250	9	4 259
Other comprehensive income	18, 19				565	(314)		(1)	250	(1)	249
Total comprehensive income for the year		–	–	–	565	(314)	–	4 249	4 500	8	4 508
Share-based payments			149						149		149
Settlement of share-based payments			(100)				73		(27)		(27)
Acquisition of treasury shares ⁽¹⁾	18			(300)			(12)		(312)		(312)
Cancellation of treasury shares ⁽¹⁾	18			300			(300)		–		–
Dividends	18							(337)	(337)	(17)	(354)
Total transactions with owners		–	49	–	–	–	(239)	(337)	(527)	(17)	(544)
31 December 2022		246	503	(352)	169	3 905	15 487	1 375	21 333	93	21 426

(1) Treasury shares were acquired as part of the share buyback program announced on 3 February 2022. The shares were repurchased using the reserve for invested unrestricted equity. The repurchased shares were canceled on 8 December 2022.

The notes are an integral part of these consolidated financial statements.

Notes to consolidated financial statements

1. Corporate information

Nokia Corporation, a public limited liability company incorporated and domiciled in Helsinki, Finland, is the parent company (Parent Company or Parent) for all its subsidiaries (Nokia or the Group). Nokia is a global provider of mobile, fixed and cloud network solutions combining hardware, software and services, as well as licensing of intellectual property, including patents, technologies and the Nokia brand. Nokia's operational headquarters are located in Espoo, Finland. The shares of Nokia Corporation are listed on the Nasdaq Helsinki Stock Exchange, the New York Stock Exchange and the Euronext Paris Stock Exchange.

These consolidated financial statements for the year ended 31 December 2022 were authorized for issuance and filing by the Board of Directors on 2 March 2023.

2. Significant accounting policies

Basis of presentation and statement of compliance

The consolidated financial statements are prepared in accordance with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB) and as adopted by the European Union (EU). The consolidated financial statements are presented in millions of euros (EURm), except as otherwise noted, and are prepared under the historical cost convention, except as disclosed in the accounting policies below. The consolidated financial statements also conform to the Finnish accounting and company legislation.

Other information

This paragraph is included in connection with statutory reporting requirements in Germany. The fully consolidated German subsidiary, Nokia Solutions and Networks GmbH & Co. KG, registered in the commercial register of Munich under HRA 88537, has made use of the exemption available under § 264b and § 291 of the German Commercial Code (HGB).

Principles of consolidation

The consolidated financial statements comprise the financial statements of the Parent Company, and each of those companies over which it exercises control. Control over an entity exists when Nokia is exposed, or has rights, to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. Presumption is that a majority of voting rights results in control. To support this presumption, Nokia considers all relevant facts and circumstances in assessing whether it has power over the entity including voting rights and potential voting rights, rights to appoint key management personnel and rights arising from other contractual arrangements. Consolidation of a subsidiary begins when Nokia obtains control over the subsidiary and ceases when it loses control over the subsidiary.

All intercompany transactions are eliminated as part of the consolidation process. Non-controlling interest represents the proportion of net profit or loss, other comprehensive income and net assets in subsidiaries that is not attributable to the equity holders of the Parent.

Business combinations

Business combinations are accounted for using the acquisition method. The consideration transferred in a business combination is measured as the aggregate of the fair values of the assets transferred, liabilities incurred towards the former owners of the acquired entity or business and equity instruments issued. Acquisition-related costs are recognized as expenses in the consolidated income statement in the period in which the costs are incurred and the related services are received with the exception of costs directly attributable to the issuance of equity instruments that are accounted for as a deduction from equity.

Identifiable assets acquired and liabilities assumed are measured at the acquisition date fair values. Nokia elects whether to measure the non-controlling interests in the acquiree at fair value or at the proportionate share of the acquiree's identifiable net assets on a business combination by business combination basis. The excess of the aggregate of the consideration transferred and the amount recognized for non-controlling interests over the acquisition date fair values of the identifiable net assets acquired is recorded as goodwill.

Investments in associates and joint ventures

An associate is an entity over which Nokia exercises significant influence. A joint venture is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the arrangement.

Nokia's investments in associates and joint ventures are accounted for using the equity method. Under the equity method, the investment in an associate or joint venture is initially recognized at cost. The carrying amount of the investment is adjusted to recognize changes in Nokia's share of net assets of the associate or joint venture since the acquisition date. Nokia's share of profits and losses of associates and joint ventures is reflected in the consolidated income statement. Any change in other comprehensive income of associates and joint ventures is presented as part of Nokia's other comprehensive income.

Non-current assets (or disposal groups) held for sale and discontinued operations

Non-current assets or disposal groups are classified as assets held for sale if their carrying amounts will be recovered principally through a sale transaction rather than through continuing use. Non-current assets classified as held for sale, or included in a disposal group classified as held for sale, are not depreciated or amortized.

Discontinued operation is reported when a component of Nokia, comprising operations and cash flows that can be clearly distinguished both operationally and for financial reporting purposes from the rest of Nokia, has been disposed of or is classified as held for sale, and that component represents a major line of business or geographical area of operations or is part of a single coordinated plan to dispose of a separate major line of business or geographical area of operations. Profit or loss from discontinued operations is reported separately from income and expenses from continuing operations in the consolidated income statement, with prior periods presented on a comparative basis. Intra-group revenues and expenses between continuing and discontinued operations are eliminated. Discontinued operations presented in these consolidated financial statements comprise the financial results related to the HERE digital mapping and location services business and the Devices & Services business sold in 2015 and 2014, respectively.

Revenue recognition

Nokia accounts for a contract with a customer when the contract has been approved in writing, which is generally when both parties are committed to perform their respective obligations, the rights, including payment terms, regarding the goods and services to be transferred can be identified, the contract has commercial substance, and collection of the consideration to which Nokia expects to be entitled is probable. Management considers only legally enforceable rights in evaluating the accounting for contracts with customers. As such, frame agreements that do not create legally enforceable rights and obligations are accounted for based on the issuance of subsequent legally binding purchase orders under the frame agreements.

A contract modification or a purchase order is accounted for as a separate contract if the scope of the contract increases by additional distinct goods or services, and the price of the contract increases by an amount that reflects the standalone selling price of those additional goods or services. In case the additional goods or services are distinct but not sold at a standalone selling price, the contract modification is accounted for prospectively. In cases where the additional goods or services are not distinct, the modification is accounted for through a cumulative catch-up adjustment.

Nokia recognizes revenue from contracts with customers to reflect the transfer of promised goods and services to customers for amounts that reflect the consideration to which Nokia expects to be entitled in exchange for those goods and services. The consideration may include a variable amount, which Nokia estimates based on the most likely amount. Items causing variability include volume discounts and sales-based or usage-based royalties. Nokia includes variable consideration into the transaction price only to the extent that it is highly probable that a significant revenue reversal will not occur. The transaction price also excludes amounts collected on behalf of third parties.

In case the timing of payments provides either the customer or Nokia with a significant benefit of financing, the transaction price is adjusted for the effect of financing and the related interest revenue or interest expense is presented separately from revenue. As a practical expedient, Nokia does not account for financing components if, at contract inception, the consideration is expected to be received within one year before or after the goods or services have been transferred to the customer.

Nokia enters into contracts with customers consisting of any combination of hardware, services and intellectual property. Hardware and software sold by Nokia includes warranty, which can either be assurance-type for repair of defects and replacement of hardware recognized as a centralized warranty provision, or service-type for scope beyond the repair of defects or for a time period beyond the standard assurance-type warranty period and considered a separate performance obligation within the context of the contract.

The associated revenue recognized for such contracts depends on the nature of the underlying goods and services provided. The promised goods or services in the contract might include sale of goods, license of intellectual property and grant of options to purchase additional goods or services that may provide the customer with a material right. Nokia conducts an assessment at contract inception to determine which promised goods and services in a customer contract are distinct and accordingly identified as performance obligations.

The standalone selling price of each performance obligation is determined by considering factors such as the price of the performance obligation if sold on a standalone basis and the expected cost of the performance obligation plus a reasonable margin when price references are not available. The portion of the transaction price allocated to each performance obligation is then recognized when the revenue recognition criteria for that performance obligation have been met.

Nokia allocates the transaction price to each distinct performance obligation on the basis of their standalone selling prices, relative to the overall transaction price. If a standalone selling price is not observable, it is estimated. The transaction price may include a discount or a variable amount of consideration that is generally allocated proportionately to all performance obligations in the contract unless Nokia has observable evidence that the entire discount relates to only one or more, but not all, performance obligations in a contract. The amount of revenue recognized is the amount allocated to the satisfied performance obligation based on the relative standalone selling prices. A performance obligation may be satisfied at a point in time or over time.

Nokia presents its customer contracts in the consolidated statement of financial position as either a contract asset or a contract liability, depending on the relationship between Nokia's performance and the customer's payment for each individual contract. On a net basis, a contract asset position represents where Nokia has performed by transferring goods or services to a customer before the customer has provided the associated consideration or before payment is due. Conversely, a contract liability position represents where a customer has paid consideration or payment is due, but Nokia has not yet transferred goods or services to the customer. Contract assets presented in the consolidated statement of financial position are current in nature while contract liabilities can be either current or non-current. Invoices are generally issued as control transfers and/or as services are rendered. Invoiced receivables represent unconditional rights to payment and are presented separately as trade receivables in the consolidated statement of financial position.

Sale of products

Nokia manufactures and sells a range of networking equipment, covering the requirements of network operators. Revenue for these products is recognized when control of the products has transferred, the determination of which may require judgment. Typically, for standard equipment sales, control transfers upon delivery. For more complex solutions, control generally transfers upon acceptance.

In some arrangements, mainly within the Submarine Networks business, Nokia's performance does not create an asset with an alternative use and Nokia recognizes revenue over time using the output method, which faithfully depicts the manner in which the asset is transferred to the customer as well as Nokia's enforceable rights to payment for the work completed to date, including margin. The output measure selected by Nokia for each contract may vary depending on the nature of the contract.

Sale of services

Nokia provides services related to the provision of networking equipment, ranging from managing a customer's network and product maintenance services to network installation, integration and optimization. Revenue for each separate service performance obligation is recognized as or when the customer obtains the benefits of Nokia's performance. Service revenue is recognized over time for managed and maintenance services, as in these cases Nokia performs throughout a fixed contract term and the customer simultaneously receives and consumes the benefits as Nokia performs. In some cases, Nokia performs services that are subject to customer acceptance where revenue is recognized when the customer acceptance is received.

Sale of intellectual property licenses

Nokia provides its customers with licenses to intellectual property (IP) owned by Nokia by granting software licenses and rights to benefit from Nokia's IP in their products. When a software license is sold, revenue is recognized upon delivery or acceptance of the software, as Nokia has determined that each software release is distinct and the license is granted for software as it exists when the control transfers to the customer.

When Nokia grants customers a license to use IP owned by Nokia, the associated license fee revenue is recognized in accordance with the substance of the relevant agreements. In the majority of cases, Nokia retains obligations to continue to develop and make available to the customer the latest IP in the licensed assets during the contract term, and therefore revenue is recognized pro rata over the period during which Nokia is expected to perform. Recognition of the revenue as pro rata over the term of the license is considered the most faithful depiction of Nokia's satisfaction of the performance obligation as the IP being licensed towards the customer includes new inventions patented by Nokia that are highly interdependent and interrelated and created through the course of continuous research and development (R&D) efforts that are relatively stable throughout the year. In some contracts, Nokia has no remaining obligations to perform after granting a license to the initial IP, and licensing fees are non-refundable. In these cases, revenue is recognized at the beginning of the license term.

Government grants

Government grants are recognized when there is reasonable assurance that Nokia will comply with the conditions attached to them and the grants will be received. Government grants received as compensation for expenses or losses incurred are recognized in the consolidated income statement as a deduction against the related expenses except for certain non-recurring grants that are recognized as other operating income. Government grants related to assets are presented in the consolidated statement of financial position as deferred income and recognized as income over the same period the asset is depreciated or amortized.

Government grants received in the form of R&D tax credits are recognized as a deduction against R&D expenses if the amount of the tax credit is linked to the amount of R&D expenditures incurred by Nokia and the tax credit is a fully collectible asset that will be paid in cash by the government in case Nokia is not able to offset it against its income tax payable. R&D tax credits that do not meet both conditions are recognized as income tax benefit.

Employee benefits

Pensions and other post-employment benefits

Nokia has various post-employment plans in accordance with the local conditions and practices in the countries in which it operates. Nokia's defined benefit plans comprise significant pension programs and schemes as well as material other post-employment benefit plans providing post-employment healthcare and life insurance coverage to certain employee groups. Defined benefit plans expose Nokia to various risks such as investment risk, interest rate risk, life expectancy risk, and regulatory/compliance risk. The characteristics and extent of these risks vary depending on the legal, fiscal and economic requirements in each country, as well as the impact of global events. The plans are generally funded through payments to insurance companies or contributions to trustee-administered funds as determined by periodic actuarial calculations.

In a defined contribution plan, Nokia's legal or constructive obligation is limited to the amount that it agrees to contribute to the fund. Nokia's contributions to defined contribution plans, multi-employer and insured plans are recognized in the consolidated income statement in the period to which the contributions relate. If a pension plan is funded through an insurance contract where Nokia does not retain any legal or constructive obligations, the plan is treated as a defined contribution plan. All arrangements that do not fulfill these conditions are considered defined benefit plans.

For defined benefit plans, including pension and post-employment healthcare and life insurance, costs are assessed using the projected unit credit method: the cost is recognized in the consolidated income statement so as to spread the benefit over the service lives of employees. The defined benefit obligation is measured as the present value of the estimated future cash outflows using interest rates on high-quality corporate bonds or government bonds with maturities that most closely match expected payouts of benefits. The defined benefit plan asset is measured at fair market value as of the reporting date. The liability or asset recognized in the consolidated statement of financial position is the present value of the defined benefit obligation as of the reporting date less the fair value of plan assets including effects of any asset ceiling.

Service cost related to employees' service in the current period as well as past service cost resulting from plan amendments, curtailments, and gains and losses on settlements are all presented within cost of sales, research and development expenses or selling, general and administrative expenses in the consolidated income statement. Past service costs are recognized immediately in the consolidated income statement when the plan amendment, curtailment or settlement occurs. Net interest, consisting of interest calculated by applying a discount rate to the net defined benefit liability or asset and the effect of asset ceiling, as well as pension plan administration costs not taken into account in determining the return on plan assets, are presented within financial income and expenses in the consolidated income statement. Remeasurements, comprising actuarial gains and losses, the effect of the asset ceiling and the return on plan assets, excluding amounts recognized in net interest, are recognized immediately in the consolidated statement of financial position with a corresponding debit or credit to pension remeasurements reserve within shareholders' equity through other comprehensive income in the period in which they occur. Remeasurements are not reclassified to profit or loss in subsequent periods.

Actuarial valuations for Nokia's defined benefit post-employment plans are performed annually or when a material plan amendment, curtailment or settlement occurs.

Share-based payments

Nokia offers three types of global share-based compensation plans for employees: performance shares, restricted shares and the employee share purchase plan.

Employee services received and the corresponding increase in equity are measured by reference to the fair value of the equity instruments as of the grant date, excluding the impact of any non-market vesting conditions. Plans that apply tranching vesting are accounted for under the graded vesting model. Equity-based incentive grants are expected to be settled with equity, and are generally conditional on continued employment as well as the fulfillment of any performance conditions specified in the award terms. Until the Nokia shares are delivered, the participants do not have any shareholder rights, such as voting or dividend rights, associated with the shares. The share grants are generally forfeited if the employment relationship with Nokia terminates prior to vesting. Share-based compensation is recognized as an expense in the consolidated income statement over the relevant service periods.

Income taxes

Income tax expense comprises current tax and deferred tax. Tax is recognized in the consolidated income statement except to the extent that it relates to items recognized in other comprehensive income, or directly in equity, in which case the related tax is recognized in other comprehensive income or equity, respectively.

Current taxes are based on the results of the Group companies and are calculated using the local tax laws and tax rates that are enacted or substantively enacted as of the reporting date. Corporate taxes withheld at the source of the income on behalf of the Group companies are accounted for as income taxes when determined to represent a tax on net income.

Deferred tax assets and liabilities are determined using the balance sheet liability method for all temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. Deferred tax assets are recognized to the extent it is probable that future taxable profit will be available against which the unused tax losses, unused tax credits and deductible temporary differences can be utilized in the relevant jurisdictions. Deferred tax assets are assessed for realizability as of each reporting date. When facts and circumstances indicate it is no longer probable that deferred tax assets will be utilized, adjustments are made as necessary. Deferred tax liabilities are recognized for taxable temporary differences, and for temporary differences that arise between the fair value and the tax base of identifiable net assets acquired in business combinations.

Deferred tax liabilities are not recognized if they arise from the initial recognition of goodwill. Deferred tax liabilities are provided on taxable temporary differences arising from investments in subsidiaries, associates and joint arrangements, except for deferred tax liability where the timing of the reversal of the temporary difference is controlled by Nokia, and it is probable that the temporary difference will not reverse in the foreseeable future.

Deferred tax assets and deferred tax liabilities are measured using the enacted or substantively enacted tax rates as of the reporting date that are expected to apply in the period when the asset is realized or the liability is settled. Deferred tax assets and liabilities are not discounted.

Deferred tax assets and deferred tax liabilities are offset for presentation purposes when there is a legally enforceable right to set off current tax assets against current tax liabilities, and the deferred tax assets and deferred tax liabilities relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities, which intend either to settle current tax liabilities and assets on a net basis, or to realize the assets and settle the liabilities simultaneously in each future period in which significant amounts of deferred tax liabilities or deferred tax assets are expected to be settled or recovered.

Nokia periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. It adjusts the amounts of current and deferred tax assets and liabilities recorded, where it is considered probable, i.e. more likely than not, that certain tax positions may not be fully sustained upon review by tax authorities. The amounts recorded are based on the most likely amount or the expected value, depending on which method Nokia expects to better predict the resolution of the uncertainty, as of each reporting date.

Foreign currency translation

Functional and presentation currency

The financial statements of all Group companies are measured using functional currency, which is the currency of the primary economic environment in which the entity operates. The consolidated financial statements are presented in euro, the functional and presentation currency of the Parent Company.

Transactions in foreign currencies

Transactions in foreign currencies are recorded at exchange rates prevailing at the dates of the individual transactions. For practical reasons, a rate that approximates the actual rate at the date of the transaction is often used. Monetary assets and liabilities denominated in foreign currency are valued at the exchange rates prevailing at the end of the reporting period. Foreign exchange gains and losses arising from monetary assets and liabilities as well as fair value changes of related hedging instruments are recognized in financial income and expenses in the consolidated income statement. Unrealized foreign exchange gains and losses related to non-monetary non-current financial investments are included in the fair value measurement of these investments and recognized in other operating income and expenses in the consolidated income statement.

Foreign Group companies

On consolidation, the assets and liabilities of foreign operations whose functional currency is other than euro are translated into euro at the exchange rates prevailing at the end of the reporting period. The income and expenses of these foreign operations are translated into euro at the average exchange rates for the reporting period. The exchange differences arising from translation for consolidation are recognized as translation differences in the consolidated statement of comprehensive income. On disposal of a foreign operation the cumulative amount of translation differences relating to that foreign operation is reclassified to profit or loss.

Intangible assets

Intangible assets acquired separately are measured on initial recognition at cost. Internally generated intangibles, except for development costs that may be capitalized, are expensed as incurred. Development costs are capitalized only if Nokia has the technical feasibility to complete the asset; has an ability and intention to use or sell the asset; can demonstrate that the asset will generate future economic benefits; has resources available to complete the asset; and has the ability to measure reliably the expenditure during development.

The useful life of Nokia's intangible assets, other than goodwill, is finite. Following initial recognition, finite intangible assets are carried at cost less accumulated amortization and accumulated impairment losses. Intangible assets are amortized over their useful lives, generally three to ten years, using the straight-line method, which is considered to best reflect the pattern in which the asset's future economic benefits are expected to be consumed. Depending on the nature of the intangible asset, the amortization charges are presented within cost of sales, research and development expenses or selling, general and administrative expenses in the consolidated income statement.

Property, plant and equipment

Property, plant and equipment are stated at cost less accumulated depreciation and accumulated impairment losses. Depreciation is recorded on a straight-line basis over the expected useful lives of the assets as follows:

Buildings and constructions	
Buildings and constructions	20–33 years
Light buildings and constructions	3–20 years
Vessels	
Cable-laying vessels	15–40 years
Cable-laying accessories	4–10 years
Machinery and equipment	
Production machinery, measuring and test equipment	1–5 years
Other machinery and equipment	3–10 years

Land and water areas are not depreciated.

Maintenance, repairs and renewals are generally expensed in the period in which they are incurred. However, major renovations are capitalized and included in the carrying amount of the asset when it is probable that future economic benefits in excess of the originally assessed standard of performance of the existing asset will flow to Nokia. Major renovations are depreciated over the remaining useful life of the related asset. Leasehold improvements are depreciated over the shorter of the lease term and the useful life. Gains and losses on the disposal of property, plant and equipment are included in other operating income or expenses.

Leases

Nokia assesses at contract inception whether a contract is, or contains, a lease. At the commencement date of the lease, Nokia recognizes a right-of-use asset and a lease liability for all leases with a lease term exceeding 12 months. The commencement date is the date when the lessor makes the underlying leased asset available for use by Nokia.

Nokia applies a practical expedient whereby leases for which the lease term is 12 months or less at the lease commencement date (short-term leases) are not recognized in its consolidated statement of financial position. Instead, Nokia recognizes the lease payments associated with short-term leases as an operating expense on a straight-line basis over the lease term. In addition, as a practical expedient, Nokia does not separate certain non-lease components from lease components but instead accounts for each lease component and associated specified non-lease component as a single lease component. Non-lease components such as payments for maintenance and services made in conjunction with the leased asset are included in the lease liability whenever these payments are fixed and defined in the lease contract. Other payments for non-lease components that are variable based on consumption, e.g. property taxes, insurance payments and variable property service costs, are recognized as an expense when incurred.

The majority of Nokia's leased assets relate to commercial and industrial properties such as R&D facilities, production facilities and office buildings. Nokia also leases vehicles provided as employee benefits and service vehicles.

Right-of-use assets are measured at cost less accumulated depreciation and impairment losses, and adjusted for any remeasurements of the lease liabilities. The cost of right-of-use assets includes the amount of lease liabilities recognized, initial direct costs incurred, and lease payments made at or before the commencement date less any lease incentives received. Right-of-use assets are depreciated on a straight-line basis over the lease term as follows:

Buildings	3–15 years
Other	3–5 years

Lease liabilities are measured at the present value of lease payments to be made over the lease term. Nokia determines the lease term as the non-cancellable term of the lease, together with any periods covered by an option to extend the lease if it is reasonably certain to be exercised, as well as any periods covered by an option to terminate the lease if it is reasonably certain not to be exercised. The lease payments include fixed lease payments and certain fixed non-lease components less any lease incentives receivable, variable lease payments that depend on an index or a rate, and appropriate termination fees whenever the lease term has been determined based on the expectation that Nokia will exercise its option to terminate. Nokia does not generally enter into lease contracts with variable lease payments linked to future performance or use of an underlying asset.

After the commencement date, the amount of lease liabilities is measured on an amortized cost basis using the effective interest method where the lease liabilities increase related to the accretion of interest and decrease for lease payments made. In addition, the carrying amounts for the right-of-use asset and lease liability are remeasured if there is a modification, a change in the lease term or a change in the future lease payments resulting from a change in an index or rate used to determine such lease payments. The interest component of the lease payments is recognized as interest expense within financial expenses.

Nokia uses its incremental borrowing rate to calculate the present value of lease payments as the interest rate implicit in the lease is not readily determinable. Nokia estimates its incremental borrowing rate quarterly based on the rate of interest that Nokia would pay to borrow over the lease term with a similar security to obtain an asset of a similar value to the leased asset in a similar economic environment. Nokia measures all leases at amortized cost based on the appropriate discount rate available in the quarter when lease commencement occurred. Where a lease contract modification or reassessment of the lease liability resulting from a change in the lease term occurs, Nokia remeasures the present value of the lease liability based on the appropriate discount rate available in the quarter when the reassessment or modification occurs.

Impairment of goodwill, intangible assets, property, plant and equipment and right-of-use assets

Nokia assesses the recoverability of the carrying value of goodwill, intangible assets, property, plant and equipment and right-of-use assets if events or changes in circumstances indicate that the carrying value may be impaired. In addition, Nokia tests the carrying value of goodwill for impairment annually even if there is no indication of impairment.

Factors that Nokia considers when it reviews indications of impairment include, but are not limited to, underperformance of the asset relative to its historical or projected future results, significant changes in the manner of using the asset or the strategy for the overall business, and significant negative industry or economic trends.

Goodwill is allocated to the cash-generating units or groups of cash-generating units that are expected to benefit from the synergies of the related business combination and that reflect the lowest level at which goodwill is monitored for internal management purposes. A cash-generating unit, as determined for the purposes of Nokia's goodwill impairment testing, is the smallest group of assets generating cash inflows that are largely independent of the cash inflows from other assets or groups of assets. The carrying value of a cash-generating unit includes its share of relevant corporate assets allocated to it on a reasonable and consistent basis. When the composition of one or more groups of cash-generating units to which goodwill has been allocated is changed, the goodwill is reallocated based on the relative fair value of the affected groups of cash-generating units.

Nokia conducts its impairment testing by determining the recoverable amount for an asset, a cash-generating unit or groups of cash-generating units. The recoverable amount of an asset, a cash-generating unit or groups of cash-generating units is the higher of its fair value less costs of disposal and its value-in-use. The recoverable amount is compared to the asset's, cash-generating unit's or groups of cash-generating units' carrying value. If the recoverable amount for the asset, cash-generating unit or groups of cash-generating units is less than its carrying value, the asset is considered impaired and is written down to its recoverable amount. Impairment losses are presented in cost of sales, research and development expenses or selling, general and administrative expenses in the consolidated income statement, except for impairment losses on goodwill, which are presented in other operating expenses.

Inventories

Inventories are stated at the lower of cost and net realizable value. Cost is determined using standard cost, which approximates actual cost on a first-in first-out (FIFO) basis. Net realizable value is the amount that can be realized from the sale of the inventory in the normal course of business after allowing for the costs of realization. In addition to the cost of materials and direct labor, an appropriate proportion of production overhead is included in the cost of inventory. An allowance is recorded for excess inventory and obsolescence based on the lower of cost and net realizable value.

Fair value measurement of financial instruments

A number of financial instruments are measured at fair value as of each reporting date after initial recognition. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value of an asset or a liability is measured using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest, by using quoted market rates, discounted cash flow analyses and other appropriate valuation models. Nokia uses valuation techniques that are appropriate in the circumstances and for which sufficient data is available to measure fair value, maximizing the use of relevant observable inputs and minimizing the use of unobservable inputs. All financial assets and liabilities for which fair values are being measured or disclosed in the consolidated financial statements are categorized within the fair value hierarchy, described as follows, based on the lowest level input that is significant to the fair value measurement as a whole:

Level 1—Quoted (unadjusted) market prices for exchange-traded products in active markets for identical assets or liabilities;

Level 2—Valuation techniques for which significant inputs other than quoted prices are directly or indirectly observable; and

Level 3—Valuation techniques for which significant inputs are unobservable.

Nokia categorizes assets and liabilities that are measured at fair value on a recurring basis into an appropriate level of the fair value hierarchy at the end of each reporting period.

Classification and measurement of financial assets

Nokia has classified its financial assets that are debt instruments in the following three categories: financial assets measured at amortized cost, financial assets measured at fair value through other comprehensive income, and financial assets measured at fair value through profit and loss. Nokia has classified its financial assets that are equity instruments to financial assets measured at fair value through profit and loss. The selection of the appropriate category is made based on both Nokia's business model for managing the financial asset and on the contractual cash flow characteristics of the asset.

Nokia's business model for managing financial assets is defined on a portfolio level. The business model must be observable on a practical level by the way the business is managed. The cash flows of financial assets measured at amortized cost are solely payments of principal and interest. These assets are held within a business model that has an objective to hold assets to collect contractual cash flows. Financial assets measured at fair value through other comprehensive income have cash flows that are solely payments of principal and interest and these assets are held within a business model that has an objective that is achieved both by holding financial assets to collect contractual cash flows and selling financial assets. Financial assets measured at fair value through profit and loss are assets that do not fall in either of these two categories. In addition to the classification as described above, the accounting for financial assets is impacted if the financial asset is part of a hedging relationship (see below the section on Hedge accounting).

All purchases and sales of financial assets are recorded on the trade date, that is, when Nokia commits to purchase or sell the asset. A financial asset is derecognized when substantially all the risks and rewards related to the financial asset have been transferred to a third party that assumes control of the financial asset.

Other non-current financial investments

Other non-current financial investments include investments in unlisted private equity shares and unlisted venture funds. As these equity and debt investments do not fulfill the criteria of being solely payments of principal and interest, they are classified as fair value through profit and loss and are initially recognized and subsequently remeasured at fair value.

Fair value is estimated using a number of methods, including, but not limited to: quoted market rates; the current market value of similar instruments; prices established from a recent arm's-length financing transaction of target companies; and analysis of market prospects and operating performance of target companies, taking into consideration public market comparable companies in similar industry sectors. Nokia uses judgment in selecting the appropriate valuation methodology as well as underlying assumptions based on existing market practice and conditions.

Fair value adjustments, foreign exchange gains and losses as well as realized gains and losses from the disposal of these investments are recognized within other operating income and expenses in the consolidated income statement.

Other non-current financial assets

Other non-current financial assets include restricted assets and other receivables, customer and vendor financing related loan receivables and certain other financial assets of a long-term nature.

Restricted assets and other receivables include restricted bank deposits primarily related to employee benefits as well as other loan receivables. These assets are initially measured at fair value and in subsequent periods at amortized cost using the effective interest method. Interest calculated using the effective interest method as well as foreign exchange gains and losses are recognized in financial income and expenses in the consolidated income statement. For these assets, a loss allowance is calculated on a quarterly basis based on a review of collectability and available collateral, recorded as an adjustment to the carrying amount of the investment and recognized in other financial expenses in the consolidated income statement.

Customer- and vendor-related loan receivables are managed in a portfolio with a business model of holding investments to collect principal and interest as well as selling investments. They are initially recognized and subsequently remeasured at fair value determined using the discounted cash flow method. The changes in fair value are recognized in fair value reserve in other comprehensive income. Interest calculated using the effective interest method as well as foreign exchange gains and losses are recognized in financial income and expenses in the consolidated income statement. Estimated credit loss is typically based on 12-month expected credit loss for existing loans and estimated additional draw-downs during that period; refer to Impairments section for further detail. Loss allowance is calculated on a quarterly basis based on a review of collectability and available collateral, and recorded in other financial expenses in the consolidated income statement reducing fair value loss recorded in other comprehensive income. In case a receivable is sold, the impact of expected credit loss is reversed, and the full gain or loss incurred for the sale is recorded in financial income and expenses in the consolidated income statement.

The cash flows of other financial assets of a long-term nature do not fulfill the criteria of being solely payments of principal and interest. These investments are initially recognized and subsequently remeasured at fair value using quoted market rates, discounted cash flow models or other appropriate valuation methods as of the reporting date. Fair value adjustments, foreign exchange gains and losses as well as realized gains and losses from the disposal of these investments are mainly recognized within financial income and expenses in the consolidated income statement.

Non-current interest-bearing financial investments

Non-current interest-bearing financial investments include investments in highly liquid corporate bonds that are long-term in nature based on their initial maturity. These investments are initially measured at fair value and in subsequent periods measured at amortized cost using the effective interest method. These investments are executed with the main purpose of collecting contractual cash flows and principal repayments. However, investments are sold from time to time for liquidity management and market risk mitigation purposes.

For these investments interest calculated using the effective interest method, as well as foreign exchange gains and losses, are recognized in financial income and expenses in the consolidated income statement. When an investment is disposed of, the difference between the carrying amount derecognized and the consideration received is recognized in financial income and expenses in the consolidated income statement. The FIFO method is used to determine the cost basis of fixed income securities at amortized cost that are being disposed of.

Due to the high credit quality of Nokia's investment portfolio, the estimated credit loss is normally based on 12-month expected credit loss. Loss allowance is calculated on a quarterly basis, recorded as an adjustment to the carrying amount of the investment and recognized in other financial expenses in the consolidated income statement.

Other current financial assets

Other current financial assets include current part of other non-current financial assets and short-term loan receivables as well as derivative assets that are discussed separately in the Derivative financial instruments section below.

Short-term loan receivables are initially measured at fair value and in subsequent periods measured at amortized cost using the effective interest method. Interest calculated using the effective interest method as well as foreign exchange gains and losses are recognized in financial income and

expenses in the consolidated income statement. For these loans, a loss allowance is calculated on a quarterly basis based on a review of collectability and available collateral, recorded as an adjustment to the carrying amount of the investment and recognized in other financial expenses in the consolidated income statement.

Trade receivables

Trade receivables arise from contracts with customers and represent an unconditional right to receive the consideration and only the passage of time is required before the consideration is received. Nokia sells trade receivables to various financial institutions without recourse in the normal course of business, in order to manage credit risk and working capital cycle, and the business model for managing trade receivables is holding receivables to collect contractual cash flows and selling receivables. Trade receivables are initially recognized and subsequently remeasured at fair value, determined using the discounted cash flow method. The changes in fair value are recognized in fair value reserve in other comprehensive income. If trade receivables are sold, the difference between the carrying amount derecognized and the consideration received is recognized in financial expenses in the consolidated income statement.

Current interest-bearing financial investments

Nokia invests a portion of the corporate cash needed to cover the projected cash outflows of its ongoing business operations in highly liquid, interest-bearing investments. Current interest-bearing financial investments may include investments measured at amortized cost and investments measured at fair value through profit and loss.

Corporate cash investments in bank deposits used as collateral for derivative transactions are initially measured at fair value and in subsequent periods measured at amortized cost using the effective interest method. Interest calculated using the effective interest method as well as foreign exchange gains and losses are recognized in financial income and expenses in the consolidated income statement.

Corporate cash investments in bank deposits, as well as fixed income and money market securities with initial maturity or put feature longer than three months that have characteristics of solely payments of principal and interest and are not part of structured investments, are managed in a portfolio with a business model of holding investments to collect principal and interest, and are initially measured at fair value and in subsequent periods measured at amortized cost using the effective interest method. These investments are executed with the main purpose of collecting contractual cash flows and principal repayments. However, investments are sold from time to time for liquidity management and market risk mitigation purposes.

For these investments interest calculated using the effective interest method, as well as foreign exchange gains and losses, are recognized in financial income and expenses in the consolidated income statement. When an investment is disposed of, the difference between the carrying amount derecognized and the consideration received is recognized in financial income and expenses in the consolidated income statement. The FIFO method is used to determine the cost basis of fixed income securities at amortized cost that are being disposed of.

Due to the high credit quality of Nokia's investment portfolio, the estimated credit loss is normally based on 12-month expected credit loss. Loss allowance is calculated on a quarterly basis, recorded as an adjustment to the carrying amount of the investment and recognized in other financial expenses in the consolidated income statement.

Corporate cash investments may also include money market funds that do not qualify as cash equivalents, investments acquired for trading purposes, investment structures consisting of securities traded in combination with derivatives with complementing and typically offsetting risk factors and other investments that have cash flows not being solely payments of principal and interest. These investments are executed with the purpose of collecting contractual cash flows and principal repayments as well as for capital appreciation and can be sold at any time.

These investments are initially recognized and subsequently remeasured at fair value determined using quoted market rates, discounted cash flow models or other appropriate valuation methods as of the reporting date. Fair value adjustments, foreign exchange gains and losses and realized gains and losses are recognized in financial income and expenses in the consolidated income statement.

Cash and cash equivalents

Cash and cash equivalents include cash at bank and in hand as well as highly liquid, fixed income and money market investments that are readily convertible to known amounts of cash with maturities at acquisition of three months or less, as well as bank deposits with maturities or contractual call periods at acquisition of three months or less. Due to the high credit quality and short-term nature of these investments, there is an insignificant risk of change in value. Investments in money market funds that have a risk profile consistent with the aforementioned criteria are also classified as cash equivalents. Investments that have cash flows that are solely payments of principal and interest are measured at amortized cost. All other investments are measured at fair value through profit and loss.

Classification and measurement of financial liabilities

Nokia has classified its financial liabilities in the following categories: financial liabilities measured at amortized cost and financial liabilities measured at fair value through profit and loss. Nokia classifies derivative liabilities as well as the conditional obligation related to Nokia Shanghai Bell at fair value through profit and loss and all other financial liabilities at amortized cost.

All financial liabilities are initially recognized at fair value and, in case of borrowings and payables, net of transaction costs. Financial liabilities are derecognized when the related obligation is discharged or canceled or expired. Additionally, a substantial modification of the terms of an existing financial liability is accounted for as a derecognition of the original financial liability and the recognition of a new financial liability. On derecognition of a financial liability, the difference between the carrying amount extinguished and the consideration paid is recognized in interest expenses in the consolidated income statement.

Interest-bearing liabilities

Long-term interest-bearing liabilities are measured at amortized cost using the effective interest method. Short-term interest-bearing liabilities, including the current part of long-term interest-bearing liabilities and collaterals for derivative transactions, are measured at amortized cost using the effective interest method.

Transaction costs, interest calculated using the effective interest method as well as foreign exchange gains and losses are recognized in financial income and expenses in the consolidated income statement.

Other financial liabilities

Other financial liabilities mainly include a conditional obligation to China Huaxin as part of the Nokia Shanghai Bell definitive agreements where China Huaxin obtained the right to fully transfer its ownership interest in Nokia Shanghai Bell to Nokia in exchange for a future cash settlement. The financial liability related to the conditional obligation is measured based on the expected future cash settlement with any changes recorded in financial income and expenses in the consolidated income statement.

Other financial liabilities also include derivative liabilities that are discussed separately in the Derivative financial instruments section below.

Trade payables

Trade payables are carried at invoiced amount, which is considered to be equal to the fair value due to the short-term nature of Nokia's trade payables.

Impairments of financial assets

Impairment requirements apply to the recognition of a loss allowance for expected credit losses (ECL) on financial assets measured at amortized cost, financial assets measured at fair value through other comprehensive income, financial guarantee contracts and loan commitments. Nokia continuously assesses its financial instruments on a forward-looking basis and accounts for the changes in ECL on a quarterly basis using the following method:

■ $ECL = PD \times LGD \times EAD$

■ Probability of Default (PD) is estimated separately for the centralized investment portfolio and non-centralized investments. The estimate is based on the credit rating profile of these investments as well as specific local circumstances as applicable, unless there are specific events that would indicate that the credit rating would not be an appropriate basis for estimating credit risk at the reporting date.

■ For Loss Given Default (LGD), the recovery rate is also estimated separately for centralized investment portfolios and non-centralized investments and is based on the type of investment, specific local circumstances as applicable as well as related collateral arrangements, if any.

■ Exposure at Default (EAD) is normally the nominal value of the investment or financial guarantee. For loan commitments, EAD is based on estimated draw-down amounts for the next 12 months.

All Nokia's current and non-current interest-bearing financial investments at amortized cost are considered to have low credit risk, and the loss allowance recognized during the period is limited to 12 months' expected losses. Financial instruments that are rated as investment grade are considered to have low credit risk for the purposes of this assessment.

Nokia applies a simplified approach to recognizing a loss allowance based on measurement of lifetime expected credit losses arising from trade receivables and contract assets without significant financing components. Based on quantitative and qualitative analysis, Nokia has determined that the credit risk exposure arising from its trade receivables is low risk. Quantitative analysis focuses on historical loss rates, historic and projected sales and the corresponding trade receivables, and overdue trade receivables including indicators of any deterioration in the recovery expectation. Qualitative analysis focuses on all relevant conditions, including customer credit rating, country credit rating and political situation, to improve the accuracy of estimating lifetime expected credit losses.

For other non-current financial assets, loans, loan commitments and financial guarantees extended to third parties, the ECL is calculated separately for each significant counterparty using the method described above, including the impact of any collateral arrangements or other credit enhancements to LGD. The estimate is based on 12-month ECL unless there has been a significant increase in credit risk for the specific counterparty since the initial recognition, in which case lifetime ECL is estimated. Breaches of contract, credit rating downgrades and other credit measures are typical indicators that Nokia takes into consideration when assessing whether the credit risk on a financial instrument has increased significantly since initial recognition. Nokia considers additional indicators to determine if a financial asset is credit-impaired including whether the counterparty is in significant financial difficulties and whether it is becoming probable that the customer will enter bankruptcy or financial reorganization. Typically customer loan credit risk is higher than credit risk of trade receivables and contract assets on average.

The change in the amount of loss allowance for ECL for trade receivables and contract assets is recognized in other operating expenses and for other financial assets in financial expenses in the consolidated income statement. For assets carried at amortized cost, the loss allowance is recorded as an adjustment to the carrying amount. For assets carried at fair value through other comprehensive income, the loss allowance is recorded as an adjustment in other comprehensive income instead of adjusting the carrying amount that has already been recorded at fair value. For financial guarantee contracts, the loss allowance is recognized as an other financial liability in the statement of financial position.

Derivative financial instruments

All derivatives are recognized initially at fair value on the date a derivative contract is entered into and subsequently remeasured at fair value. The method of recognizing the resulting gain or loss varies according to whether the derivatives are designated and qualify under hedge accounting.

The cash flows of a hedge are classified as cash flows from operating activities in the consolidated statement of cash flows in case the underlying hedged items relate to Nokia's operating activities. When a derivative contract is accounted for as a hedge of an identifiable position relating to financing or investing activities, the cash flows of the contract are classified in the same way as the cash flows of the position being hedged. Certain derivatives are hedging the foreign exchange risk of Nokia's cash position and their cash flows are included in cash flows from investing activities in the consolidated statement of cash flows.

Derivatives not designated in hedge accounting relationships carried at fair value through profit and loss

Foreign exchange forward contracts are valued at market-forward exchange rates. Changes in fair value are measured by comparing these rates with the original contract-forward rate. Currency options are valued as of each reporting date by using the Garman & Kohlhagen option valuation model. Changes in fair value are recognized in the consolidated income statement.

Fair values of forward rate agreements, interest rate options, futures contracts and exchange-traded options are calculated based on quoted market rates as of each reporting date. The discounted cash flow method is used to value interest rate and cross-currency swaps. Changes in fair value are recognized in the consolidated income statement.

For derivatives not designated under hedge accounting but hedging identifiable forecast exposures such as anticipated foreign currency denominated sales and purchases, the gains and losses are recognized in other operating income or expenses in the consolidated income statement. The gains and losses on all other derivatives not designated under hedge accounting are recognized in financial income and expenses in the consolidated income statement.

Embedded derivatives included in contracts are identified and monitored by Nokia. For host contracts that are not financial assets containing embedded derivatives that are not closely related, the embedded derivatives are separated and measured at fair value as of each reporting date with changes in fair value recognized in financial income and expenses in the consolidated income statement. For host contracts that are financial assets containing embedded derivatives, the whole contract is measured at fair value as of each reporting date with changes in fair value recognized in financial income and expenses in the consolidated income statement.

Hedge accounting

Nokia applies hedge accounting on certain foreign exchange forward contracts, options or option strategies, and interest rate derivatives. Qualifying options and option strategies have zero net premium, or a net premium paid. For option structures, the critical terms of the purchased and written options are the same and the notional amount of the written option component is not greater than that of the purchased option.

In the fair valuation of foreign exchange forward contracts, Nokia separates the spot element and the forward element including the impact of foreign currency basis spread and forward points, which is considered as the cost of hedging for foreign exchange forward contracts. In the fair valuation of foreign exchange option contracts, Nokia separates the intrinsic value and time value, which is considered as the cost of hedging for foreign exchange option contracts. In the fair valuation of cross-currency swaps, Nokia separates the foreign currency basis spread that is considered as the cost of hedging for cross-currency swaps.

Cash flow hedges: hedging of forecast foreign currency denominated sales and purchases

Nokia applies cash flow hedge accounting primarily to forecast business foreign exchange exposure that arises from highly probable forecast operative business transactions. The risk management strategy is to hedge material net exposures (identified standard sales exposure minus identified standard costs exposure) by using foreign exchange forwards and foreign exchange options in a layered hedging style that follows defined hedging level ranges and hedge maturities in quarterly time buckets. The hedged item must be highly probable and present an exposure to variations in cash flows that could ultimately affect profit or loss.

Nokia only designates the spot element of the foreign exchange forward contract as the hedging instrument. Currency options, or option strategies, may also be used for cash flow hedging, in which case the intrinsic value of the option is designated as the hedging instrument. Hedge effectiveness is assessed at inception and quarterly during the hedge relationship to ensure that an economic relationship exists. As Nokia only enters in hedge relationships where the critical terms match, the assessment of effectiveness is done on a qualitative basis.

For qualifying foreign exchange forwards and foreign exchange options, the change in fair value that reflects the change in spot exchange rates on a discounted basis is recognized in hedging reserve in other comprehensive income. The changes in the forward element of the foreign exchange forwards and the time value of the options that relate to hedged items are deferred in the cost of hedging reserve in other comprehensive income and are subsequently accounted for in the same way as the spot element or intrinsic value.

In each quarter, Nokia evaluates whether the forecast sales and purchases are still expected to occur. If a portion of the hedged cash flow is no longer expected to occur, all related deferred gains or losses are derecognized from other comprehensive income and recognized in other operating income and expenses in the consolidated income statement as hedge accounting criteria is no longer met. If the hedged cash flow ceases to be highly probable, but is still expected to occur, accumulated gains and losses remain in other comprehensive income until the hedged cash flow affects profit or loss.

Nokia's risk management objective is to hedge forecast cash flows until the related revenue has been recognized. Each hedge relationship is discontinued during the quarter when the hedge matures, which is also the quarter that it has been designated to hedge. At this point, the accumulated profit or loss of cash flow hedges is recycled to other operating income and expenses in the consolidated income statement. In case the forecast amount of revenue is not recognized during a quarter, the full accumulated profit or loss of cash flow hedges designated for said quarter is still recycled and the portion related to forecast revenue that was not recognized is disclosed as hedge ineffectiveness.

As cash flow hedges primarily mature in the same quarter as the hedged item, there is no significant ineffectiveness resulting from time value of money. Nokia will validate the magnitude of the impact of discounting related to the amount of profit or loss recognized in other comprehensive income on a quarterly basis.

Nokia has also entered into foreign exchange forwards in relation to forecast sales and purchases that do not qualify as highly probable forecast transactions and hence do not satisfy the requirements for hedge accounting. For these foreign exchange forwards, the gains and losses are recognized in other operating income and expenses in the consolidated income statement.

Cash flow hedges: hedging of foreign exchange risk of future interest cash flows

Nokia also applies cash flow hedging to future interest cash flows in foreign currency related to issued bonds. These future interest cash flows are hedged with cross-currency swaps that have been bifurcated and designated partly as fair value hedges to hedge both foreign exchange and the interest rate benchmark risk component of the issued bond and partly as cash flow hedges to hedge the foreign exchange risk related to the remaining portion of interest cash flows on the issued bond. The accumulated profit or loss for the part of these cross-currency swaps designated as cash flow hedges is initially recorded in hedging reserve and recycled to profit or loss at the time when the related interest cash flows are settled. Nokia separates the foreign currency basis spread from cross-currency swaps and excludes it from the hedge relationship as cost of hedging that is initially recognized and subsequently measured at fair value and recorded in cost of hedging reserve in other comprehensive income.

Fair value hedges: hedging of foreign exchange exposure

In certain cases, mainly related to long-term construction projects, Nokia applies fair value hedge accounting for foreign exchange risk with the objective to reduce the exposure to fluctuations in the fair value of firm commitments due to changes in foreign exchange rates. Changes in the fair value of both spot and forward elements of the derivatives designated and qualifying as fair value hedges, together with any changes in the fair value of the hedged firm commitments attributable to the hedged risk, are recorded in financial income and expenses in the consolidated income statement.

Fair value hedges: hedging of interest rate exposure

Nokia applies fair value hedge accounting to reduce exposure to fair value fluctuations of interest-bearing liabilities due to changes in interest rates and foreign exchange rates. Nokia uses interest rate swaps and cross-currency swaps aligned with the hedged items to hedge interest rate risk and associated foreign exchange risk.

Nokia has entered into long-term borrowings mainly at fixed rate and swapped a portion of them into floating rates in line with a defined target interest profile. Nokia aims to mitigate the adverse impacts from interest rate fluctuations by continuously managing net interest exposure resulting from financial assets and liabilities by setting appropriate risk management benchmarks and risk limits. The hedged item is identified as a proportion of the outstanding loans up to the notional amount of the swaps as appropriate to achieve the risk management objective. Nokia enters into interest rate swaps that have similar critical terms as the hedged item, such as reference rate, reset dates, payment dates, maturities and notional amount and hence Nokia expects that there will be no significant ineffectiveness. Nokia has not entered into interest rate swaps where it would be paying fixed rate.

Nokia's borrowings are carried at amortized cost. Changes in the fair value of derivatives designated and qualifying as fair value hedges, together with any changes in the fair value of hedged liabilities attributable to the hedged risk, are recorded in financial income and expenses in the consolidated income statement. Nokia separates the foreign currency basis spread from cross-currency swaps and excludes it from the hedged risk as cost of hedging that is initially recognized and subsequently measured at fair value and recorded in cost of hedging reserve in other comprehensive income. If a hedge relationship no longer meets the criteria for hedge accounting, hedge accounting ceases, cost of hedging recorded in cost of hedging reserve is immediately expensed and any fair value adjustments made to the carrying amount of the hedged item while the hedge was effective are recognized in financial income and expenses in the consolidated income statement based on the effective interest method.

Hedges of net investments in foreign operations

Nokia applies hedge accounting for its foreign currency hedging of selected net investments. Hedged item can be an amount of net assets equal to or less than the carrying amount of the net assets of the foreign operation in Nokia consolidated financial statements. The risk management strategy is to protect the euro counter value of the portion of this exposure expected to materialize as non-euro cash repatriation in the foreseeable future.

Nokia only designates the spot element of the foreign exchange forward contract as the hedging instrument. Currency options, or option strategies, may also be used for net investment hedging, in which case the intrinsic value of the option is designated as the hedging instrument. Hedge effectiveness is assessed at inception and quarterly during the hedge relationship to ensure that an economic relationship exists. As Nokia only enters in hedge relationships where the critical terms match, the assessment of effectiveness is done on a qualitative basis with no significant ineffectiveness expected.

For qualifying foreign exchange forwards, foreign exchange options and option strategies, the change in fair value that reflects the change in spot exchange rates is recognized in translation differences within consolidated shareholders' equity. The changes in the forward element of foreign exchange forwards as well as the changes in the time value of options (collectively known as the "cost of hedging") is recognized in cost of hedging reserve in other comprehensive income. The cost of hedging at the date of designation of the foreign exchange forward or option contract as a hedging instrument is amortized to financial income and expenses in the consolidated income statement over the duration of the contract. Hence, in each reporting period, the change in fair value of forward element of the foreign exchange forward contract or the time value of the option contract is recorded in cost of hedging reserve, while the amortization amount is reclassified from cost of hedging reserve to profit or loss.

Accumulated changes in fair value from qualifying hedges are derecognized from translation differences within consolidated shareholders' equity on the disposal of all or part of a foreign subsidiary by sale, liquidation, repayment of share capital or abandonment. The cumulative amount or proportionate share of changes in the fair value of qualifying hedges deferred in translation differences is recognized as income or expense on disposal.

Provisions

Provision is recognized when Nokia has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources will be required to settle the obligation and a reliable estimate of the amount can be made. Management judgment may be required in determining whether it is probable that an outflow of economic benefits will be required to settle the obligation. The amount recognized as a provision is based on the best estimate of unavoidable costs required to settle the obligation at the end of the reporting period.

When estimating the amount of unavoidable costs, management may be required to consider a range of possible outcomes and their associated probabilities, risks and uncertainties surrounding the events and circumstances as well as making assumptions of the timing of payment. Changes in estimates of timing or amounts of costs required to settle the obligation may become necessary as time passes and/or more accurate information becomes available. Nokia assesses the adequacy of its existing provisions and adjusts the amounts as necessary based on actual experience and changes in facts and circumstances as of each reporting date. For descriptions of different classes of provisions, refer to Note 26, Provisions.

Contingent liabilities

Nokia discloses ongoing legal matters that relate to possible obligations whose existence will be confirmed by the occurrence or non-occurrence of one or more uncertain future events not wholly within the control of Nokia. These matters are assessed continually to determine whether an outflow of resources embodying economic benefits has become probable so as to recognize a provision.

Treasury shares

Nokia recognizes its own equity instruments that are acquired (treasury shares) as a reduction of equity at cost of acquisition. When canceled or reissued, the acquisition cost of treasury shares is recognized in retained earnings or other distributable reserves of the equity.

Dividend and equity repayment

Nokia pays dividend and/or makes equity repayments to its shareholders in quarterly installments. Each quarterly distribution is resolved by the Board of Directors separately in accordance with the authorization granted by the Annual General Meeting. Dividends and/or equity repayments are recognized in the consolidated financial statements when the Board of Directors has resolved on the quarterly payment.

3. New and amended standards and interpretations

On 1 January 2022, Nokia adopted the following amendments to the accounting standards issued by the IASB and endorsed by the EU:

- Amendments to IFRS 3 Business Combinations: Reference to the Conceptual Framework,
- Amendments to IAS 16 Property, Plant and Equipment: Proceeds before Intended Use,
- Amendments to IAS 37 Provisions, Contingent Liabilities and Contingent Assets: Onerous Contracts — Cost of Fulfilling a Contract, and
- Amendments included in the Annual Improvements to IFRS Accounting Standards 2018-2020 Cycle.

The amendments had no material impact on Nokia's consolidated financial statements.

Nokia has not early adopted any new or amended standards or interpretations that have been issued but are not yet effective. The new and amended standards and interpretations issued by the IASB that are effective in future periods are not expected to have a material impact on the consolidated financial statements of Nokia when adopted. Nokia intends to adopt these new and amended standards and interpretations, if applicable, when they become effective and are endorsed by the EU.

4. Use of estimates and critical accounting judgments

The preparation of financial statements requires use of management judgment in selecting and applying accounting policies as well as making estimates and assumptions about the future. These judgments, estimates and assumptions may have a significant effect on the amounts recognized in the financial statements.

The estimates and assumptions used in determining the carrying amounts of assets and liabilities are based on historical experience, expected outcomes and various other factors that were available when these consolidated financial statements were prepared, and they are believed to be reasonable under the circumstances. The estimates and assumptions are reviewed continually and revised if changes in circumstances occur, or as a result of new information or more experience. As estimates and assumptions inherently contain a varying degree of uncertainty, actual outcomes may differ resulting in adjustments to the carrying amounts of assets and liabilities in the subsequent periods.

The accounting matters presented in this note are determined to involve the most difficult, subjective or complex judgments, or are considered as key sources of estimation uncertainty.

Pension and other post-employment benefit obligations and expenses

Key source of estimation uncertainty

The determination of pension and other post-employment benefit obligations and expenses for defined benefit plans is dependent on a number of estimates and assumptions, including the discount rate, future mortality rate, annual rate of increase in future compensation levels, and healthcare costs trend rates and usage of services in the United States where the majority of our post-employment healthcare plans are maintained. Changes in assumptions and actuarial estimates may materially affect the benefit obligation, future expense and future cash flow. Based on these estimates and assumptions, at 31 December 2022, defined benefit obligations amount to EUR 18 312 million (EUR 22 704 million in 2021) and the fair value of plan assets amounts to EUR 22 691 million (EUR 27 128 million in 2021).

Critical accounting judgment

Where a surplus on a defined benefit scheme arises, Nokia analyzes the recoverability of the surplus through either a refund or through reduction of future contributions in determining whether it is necessary to restrict the amount of the surplus that is recognized. Nokia has two plans in the US, one plan in the UK and one in Belgium with material surplus positions with a combined surplus of EUR 6 697 million at 31 December 2022 (EUR 7 718 million in 2021). In 2021, Nokia modified the terms of all pension plans in the US after which it has made the judgment that all plans with material surplus positions meet the requirements of recoverability. The remaining pension plans for which Nokia has determined that the surplus assets are not recoverable are considered to be not material. The resulting asset ceiling limitation is recorded at EUR 84 million at 31 December 2022 (EUR 92 million in 2021).

Refer to Note 24, Pensions and other post-employment benefits.

Income taxes

Critical accounting judgment

Nokia is subject to income taxes in the jurisdictions in which it operates. Judgement is required in determining current tax expense, uncertain tax positions, deferred tax assets and deferred tax liabilities; and the extent to which deferred tax assets can be recognized.

Estimates related to the recoverability of deferred tax assets are based on forecasted future taxable income and tax planning strategies. Based on these estimates and assumptions, at 31 December 2022 Nokia has EUR 20 214 million (EUR 33 222 million in 2021) of unused tax losses, unused tax credits and deductible temporary differences for which no deferred tax assets are recognized due to uncertainty of utilization. The majority of the unrecognized deferred tax assets relate to France.

The utilization of deferred tax assets is dependent on future taxable profit in excess of the profit arising from the reversal of existing taxable temporary differences. The recognition of deferred tax assets is based on the assessment of whether it is probable that sufficient taxable profit will be available in the future to utilize the unused tax losses, unused tax credits and deductible temporary differences before the unused tax losses and unused tax credits expire. Recognition of deferred tax assets involves judgment regarding the future financial performance of the particular legal entity or tax group that has recognized the deferred tax asset. At 31 December 2022, Nokia re-recognized deferred tax assets of EUR 2.5 billion related to Finland in the consolidated statement of financial position.

Refer to Note 11, Income taxes, for further information.

5. Segment information

Nokia has four operating and reportable segments for financial reporting purposes: (1) Network Infrastructure, (2) Mobile Networks, (3) Cloud and Network Services and (4) Nokia Technologies.

In addition, Nokia provides net sales disclosure for the following business divisions within the Network Infrastructure segment: (i) IP Networks, (ii) Optical networks, (iii) Fixed Networks and (iv) Submarine Networks.

The President and CEO is the chief operating decision-maker monitoring the operating results of segments for the purpose of assessing performance and making decisions about resource allocation. Key financial performance measures of the segments comprise primarily net sales and segment operating profit. The evaluation of segment performance and allocation of resources is primarily based on segment operating profit which the management believes is the most relevant measure for this purpose. Segment operating profit excludes intangible asset amortization and other purchase price fair value adjustments, goodwill impairments, restructuring related charges and certain other items of income and expenses that may not be indicative of the business operating results.

Accounting policies of the segments are the same as those described in Note 2, Significant accounting policies, except that certain above-mentioned items of income and expenses are not allocated to the segments. Inter-segment revenues and transfers are accounted for as if the revenues were to third parties, that is, at current market prices.

Segment descriptions

Network Infrastructure

The Network Infrastructure segment serves communication service providers, enterprises, webscales and public sector customers. It comprises the following business divisions: (i) IP Networks, which provides IP networks and services for residential, mobile, enterprise and cloud applications; (ii) Optical Networks, which provides optical transport networks for metro, regional, longhaul and ultra-longhaul applications; (iii) Fixed Networks, which provides fiber, fixed wireless access, and copper technologies; and (iv) Submarine Networks, which offers undersea cable transmission.

Mobile Networks

The Mobile Networks segment creates products and services covering all mobile network generations. Its portfolio includes products for radio access networks (RAN) and microwave radio (MWR) links for transport networks, solutions for network management, as well as network planning, optimization, network deployment and technical support services.

Cloud and Network Services

The Cloud and Network Services segment is built around software and the cloud and is focused on driving leadership in cloud-native software and as-a-service delivery models, as demand for critical networks accelerates; and with strong market positions in communications software, private wireless networks, and cognitive (or intelligent) services. The Cloud and Network Services portfolio encompasses core network solutions, including both voice and packet core; business applications covering areas like security, automation, and monetization; cloud and cognitive services; and enterprise solutions covering private wireless and industrial automation.

Nokia Technologies

The Nokia Technologies segment, building on decades of innovation and R&D leadership in technologies used in virtually all mobile devices used today, is expanding the Nokia patent licensing business, increasing the strength of Nokia brand through brand licensing, and establishing a technology licensing business. The majority of net sales and related costs and expenses attributable to licensing and patenting the patent portfolio of Nokia is recorded in Nokia Technologies, while each segment separately records its own research and development expenses.

Group Common and Other

Despite not a reportable segment, Nokia also provides segment-level information for Group Common and Other. Group Common and Other includes Radio Frequency Systems which is managed as a separate entity. In addition, Group Common and Other includes certain corporate-level and centrally managed operating expenses, as well as fair value gains and losses on investments in unlisted venture funds, including investments managed by NGP Capital.

Segment information

EURm	Network Infrastructure ⁽¹⁾	Mobile Networks	Cloud and Network Services	Nokia Technologies	Group Common and Other	Eliminations and unallocated items ⁽²⁾	Nokia Group
2022							
Net sales to external customers	9 044	10 658	3 350	1 583	276	–	24 911
Net sales to other segments	3	13	1	12	19	(48)	–
Operating profit/(loss)	1 102	940	177	1 208	(318)	(791)	2 318
Share of results of associated companies and joint ventures	–	(11)	6	(8)	–	(13)	(26)
Financial income and expenses							(108)
Profit before tax							2 184
Other segment items							
Depreciation and amortization	(229)	(347)	(91)	(34)	(28)	(411)	(1 140)
2021							
Net sales to external customers	7 673	9 711	3 088	1 490	240	–	22 202
Net sales to other segments	1	6	1	12	17	(37)	–
Operating profit/(loss)	784	765	166	1 185	(125)	(617)	2 158
Share of results of associated companies and joint ventures	(1)	6	6	(2)	–	–	9
Financial income and expenses							(241)
Profit before tax							1 926
Other segment items							
Depreciation and amortization	(208)	(338)	(95)	(33)	(30)	(391)	(1 095)
2020							
Net sales to external customers	6 735	10 394	3 086	1 389	250	(2)	21 852
Net sales to other segments	1	4	1	13	19	(38)	–
Operating profit/(loss)	457	819	(67)	1 123	(251)	(1 196)	885
Share of results of associated companies and joint ventures	(1)	22	5	1	(5)	–	22
Financial income and expenses							(164)
Profit before tax							743
Other segment items							
Depreciation and amortization	(200)	(347)	(114)	(39)	(25)	(407)	(1 132)

(1) Includes IP Networks net sales of EUR 3 063 million (EUR 2 679 million in 2021 and EUR 2 585 million in 2020), Optical Networks net sales of EUR 1 891 million (EUR 1 708 million in 2021 and EUR 1 695 million in 2020), Fixed Networks net sales of EUR 2 943 million (EUR 2 358 million in 2021 and EUR 1 759 million in 2020) and Submarine Networks net sales of EUR 1 150 million (EUR 929 million in 2021 and EUR 697 million in 2020).

(2) Unallocated items comprise costs related to the intangible asset amortization and other purchase price fair value adjustments, goodwill impairments, restructuring related charges and certain other items.

Material reconciling items between total segment operating profit and operating profit for the Group

EURm	2022	2021	2020
Total segment operating profit	3 109	2 775	2 081
Amortization of acquired intangible assets	(411)	(391)	(407)
Restructuring and associated charges	(177)	(263)	(651)
Costs associated with country exit	(98)	–	–
Impairment and write-off of assets, net of reversals	(97)	(45)	(241)
Settlement of legal disputes	–	80	–
Gain on sale of fixed assets	–	53	–
Gain on defined benefit plan amendment	–	–	90
Other	(8)	(51)	13
Operating profit for the Group	2 318	2 158	885

Information by geographies and customer concentration

Net sales to external customers by country

EURm	Net sales ⁽¹⁾		
	2022	2021	2020
Finland ⁽¹⁾	1 697	1 605	1 480
United States	7 949	6 791	6 792
India	1 283	1 022	945
Japan	904	1 030	904
Other	13 078	11 754	11 731
Total	24 911	22 202	21 852

(1) Net sales to external customers by country are based on the location of the customer, except for Nokia Technologies IPR and licensing net sales which are allocated to Finland.

Major customers

As is typical for our industry, Nokia's net sales are largely driven by multi-year customer agreements with a limited number of significant customers. Net sales from Nokia's largest customer were 10% (11% in 2021 and 11% in 2020) of net sales to external customers. Net sales from the largest customer were reported by Networks Infrastructure, Mobile Networks, Cloud and Network Services as well as Group Common and Other.

Non-current assets by country

EURm	Non-current assets ⁽¹⁾	
	2022	2021
Finland	1 365	1 348
United States	5 032	5 083
France	2 180	2 029
Other	1 297	1 399
Total	9 874	9 859

(1) Consists of goodwill and intangible assets, property, plant and equipment and right-of-use assets.

6. Revenue recognition

Management has determined that Nokia's geographic areas are considered as the primary determinants to depict how the nature, amount, timing and uncertainty of revenue and cash flows are affected by economic factors. Nokia's primary customer base consists of companies that operate on a country-specific or a regional basis. Although Nokia's technology cycle is similar around the world, different countries and regions are inherently in a different stage of that cycle, often influenced by macroeconomic conditions specific to those countries and regions. In addition to Net sales to external customers by region, the chief operating decision maker also reviews Net sales by customer type disclosed below.

Each reportable segment, as described in Note 5, Segment information, consists of customers that operate in all geographic areas. No reportable segment has a specific revenue concentration in any geographic area other than Nokia Technologies, which is included within Europe.

Net sales to external customers by region are based on the location of the customer, except for Nokia Technologies IPR and licensing net sales which are allocated to Europe. In 2022, Nokia changed the way it presents net sales information on a regional basis. Nokia considers that providing net sales for the Submarine Networks business separately from the rest of the Group improves the usefulness of disclosed information by removing volatility caused by the specific nature of the Submarine Networks business. The comparative information for Net sales to external customers by region has been recast accordingly.

Net sales to external customers by region

EURm	2022	2021	2020
Asia Pacific	2 648	2 472	2 652
Europe	6 662	6 313	6 092
Greater China	1 581	1 512	1 497
India	1 290	1 035	953
Latin America	1 223	983	954
Middle East & Africa	1 969	1 771	1 886
North America	8 388	7 187	7 121
Submarine Networks	1 150	929	697
Total	24 911	22 202	21 852

Net sales by customer type

EURm	2022	2021	2020
Communications service providers	19 921	17 977	17 954
Enterprise	1 997	1 575	1 571
Licensees	1 595	1 502	1 402
Other ⁽¹⁾	1 398	1 148	925
Total	24 911	22 202	21 852

(1) Includes net sales of Submarine Networks which operates in a different market, and Radio Frequency Systems (RFS), which is being managed as a separate entity, and certain other items, such as eliminations of inter-segment revenues. Submarine Networks and RFS net sales also include revenue from communications service providers and enterprise customers.

Contract assets and contract liabilities

Contract asset balances decrease upon reclassification to trade receivables when Nokia's right to payment becomes unconditional. Contract liability balances decrease when Nokia satisfies the related performance obligations and revenue is recognized. There were no material cumulative adjustments to revenue recognized arising from changes in transaction prices, changes in measures of progress or changes in estimated variable consideration.

During the year, Nokia recognized EUR 1.6 billion (EUR 1.7 billion in 2021) of revenue that was included in the current contract liability balance at the beginning of the period.

Order backlog

At 31 December 2022, the aggregate amount of the transaction price allocated to partially or wholly unsatisfied performance obligations arising from fixed contractual commitments amounted to EUR 19.5 billion (EUR 20.3 billion in 2021 that included the amounts related to the completed contract disclosed below). Management has estimated that these unsatisfied performance obligations will be recognized as revenue as follows:

	2022	2021
Within 1 year	75%	73%
2-3 years	21%	24%
More than 3 years	4%	3%
Total	100%	100%

The estimated timing of the satisfaction of these performance obligations is subject to change owing to factors beyond Nokia's control such as customer and network demand, market conditions and, in some cases, restrictions imposed by the weather or other factors impacting project logistics. Revenue recognized in the reporting period from performance obligations satisfied (or partially satisfied) in previous periods (for example, due to changes in transaction price) was not material.

Completed Contracts

In April 2014, Nokia entered into an agreement to license certain technology patents and patent applications owned by Nokia on the effective date of that agreement, on a non-exclusive basis, to a licensee, for a period of 10 years (the "License Agreement"). Contemporaneously and under the terms of the License Agreement, Nokia issued to the licensee an option to extend the technology patent license for the remaining life of the licensed patents. Nokia received all cash consideration due for the sale of the 10-year license and option upon closing of the License Agreement. Management has determined that, upon transition to IFRS 15, Revenue from Contracts with Customers, the License Agreement is a completed contract. As such, in accordance with the transition requirements of the standard, Nokia has continued to apply its prior revenue accounting policies, based on IAS 18, Revenue, and related interpretations, to the License Agreement recognizing revenue over the term of the License Agreement.

In December 2022, the licensee exercised a contractual option to extend the license agreement for the remaining life of the licensed patents, making it in substance a perpetual license. As a result, Nokia has recognized all the remaining revenue related to the License Agreement during the year in accordance with its accounting policies based on IAS 18, Revenue, and related interpretations related to this completed contract. After the 2022 revenue recognition, Nokia will no longer recognize revenue in relation to this agreement in future periods.

7. Expenses by nature

EURm	2022	2021	2020
Personnel expenses	7 903	7 541	7 310
Cost of material	8 481	6 320	6 016
Project subcontracting and other customer contract expenses	3 156	4 225	4 887
Depreciation and amortization	1 140	1 095	1 132
IT services	376	230	343
Impairment charges	90	39	241
Other	1 545	1 037	1 164
Total operating expenses	22 691	20 487	21 093

Operating expenses include government grant income and R&D tax credits of EUR 146 million (EUR 111 million in 2021 and EUR 98 million in 2020) most of which have been recognized in the consolidated income statement as a deduction against research and development expenses.

Restructuring charges by function⁽¹⁾:

EURm	2022	2021	2020
Cost of sales	85	133	245
Research and development expenses	37	73	189
Selling, general and administrative expenses	46	78	67
Total restructuring charges	168	284	501

(1) Restructuring charges include defined benefit plan curtailment income and expenses.

8. Personnel expenses

EURm	2022	2021	2020
Salaries and wages ⁽¹⁾	6 439	6 191	6 055
Pension and other post-employment benefit expense, net	434	406	362
Share-based payment expense	149	118	76
Social security costs	881	826	817
Total	7 903	7 541	7 310

(1) Includes termination benefits.

The average number of employees is 86 896 (87 927 in 2021 and 92 039 in 2020).

9. Other operating income and expenses

EURm	2022	2021	2020
Other operating income			
Gains from unlisted venture funds	27	188	61
Subsidies and government grants	20	43	3
Gain on sale of property, plant and equipment	7	66	3
Settlements and resolutions of legal disputes	—	90	—
Other	44	56	59
Total	98	443	126
Other operating expenses			
Changes in provisions	(134)	(77)	(5)
Foreign exchange (losses)/gains on hedging forecasted sales and purchases	(107)	45	5
Expected credit losses on trade receivables	(107)	16	(171)
Impairment of disposal groups	(72)	—	—
Goodwill impairment ⁽¹⁾	—	—	(200)
Other	(19)	(97)	(78)
Total	(439)	(113)	(449)

(1) Nokia conducted an impairment test based on the long-range plan prepared in the fourth quarter of 2020 and concluded that the carrying amount exceeded the recoverable amount for its Fixed Networks group of CGUs.

10. Financial income and expenses

EURm	2022	2021	2020
Financial income			
Interest income on financial investments	69	21	30
Interest income on financing components of other contracts	13	28	38
Other financial income ⁽¹⁾	4	(6)	97
Total	86	43	165
Financial expenses			
Interest expense on interest-bearing liabilities	(103)	(113)	(127)
Negative interest on financial investments	(27)	(29)	(9)
Interest expense on financing components of other contracts ⁽²⁾	(66)	(40)	(83)
Interest expense on lease liabilities	(26)	(24)	(25)
Net interest income on defined benefit plans	92	26	—
Net fair value gains/(losses) on hedged items under fair value hedge accounting	262	25	(122)
Net fair value (losses)/gains on hedging instruments under fair value hedge accounting	(265)	(25)	118
Net foreign exchange gains/(losses)	20	(60)	(8)
Other financial expenses ⁽³⁾	(81)	(44)	(73)
Total	(194)	(284)	(329)

(1) In 2022, includes an income of EUR 11 million (expense of EUR 33 million in 2021 and income of EUR 79 million in 2020) due to a change in the fair value of the financial liability related to Nokia Shanghai Bell. Refer to Note 30, Significant partly-owned subsidiaries.

(2) In 2022, includes EUR 46 million (EUR 12 million in 2021 and EUR 31 million in 2020) related to the sale of receivables.

(3) In 2022, includes an impairment of EUR 61 million (an increase in loss allowance of EUR 32 million in 2021 and EUR 58 million in 2020) related to loans extended to an emerging market customer.

11. Income taxes

Components of the income tax benefit/(expense)

EURm	2022	2021	2020
Current tax	(426)	(409)	(295)
Deferred tax	2 452	137	(2 961)
Total	2 026	(272)	(3 256)

Income tax reconciliation

Reconciliation of the difference between income tax computed at the statutory rate in Finland of 20% and income tax recognized in the consolidated income statement:

EURm	2022	2021	2020
Income tax expense at statutory rate	(437)	(385)	(149)
Permanent differences	87	47	90
Non-creditable withholding taxes	(72)	(37)	(37)
Income taxes for prior years ⁽¹⁾	3	95	26
Effect of different tax rates of subsidiaries operating in other jurisdictions	(68)	(57)	(39)
Effect of deferred tax assets not recognized ⁽²⁾	(107)	(77)	(3 202)
Benefit arising from previously unrecognized deferred tax assets ⁽³⁾	2 646	187	105
Net decrease/(increase) in uncertain tax positions	9	(29)	(12)
Change in income tax rates	24	17	(12)
Income taxes on undistributed earnings	(59)	(33)	(26)
Total	2 026	(272)	(3 256)

(1) In 2021, relates primarily to a tax benefit related to past operating model integration.

(2) In 2020, includes a derecognition of deferred tax assets related to Finland.

(3) In 2022, includes a re-recognition of deferred tax assets related to Finland.

Income tax liabilities and assets include a net liability of EUR 182 million (EUR 192 million in 2021) relating to uncertain tax positions with inherently uncertain timing of cash outflows.

Prior period income tax returns for certain Group companies are under examination by local tax authorities. Nokia has ongoing tax investigations in various jurisdictions, including the United States, Canada, India, Brazil, Saudi Arabia, France, China and South Korea. Nokia's business and investments, especially in emerging market countries, may be subject to uncertainties, including unfavorable or unpredictable tax treatment. Management judgment and a degree of estimation are required in determining the tax expense or benefit. Even though management does not expect that any significant additional taxes in excess of those already provided for will arise as a result of these examinations, the outcome or actual cost of settlement may vary materially from estimates.

Deferred tax assets and liabilities

EURm	2022			2021		
	Deferred tax assets	Deferred tax liabilities	Net balance	Deferred tax assets	Deferred tax liabilities	Net balance
Tax losses carried forward and unused tax credits	1 011	—		794	—	
Undistributed earnings	—	(193)		—	(136)	
Intangible assets and property, plant and equipment	3 267	(309)		1 167	(176)	
Right-of-use assets	—	(177)		—	(210)	
Defined benefit pension assets	—	(1 989)		—	(2 052)	
Other non-current assets	66	(30)		49	(34)	
Inventories	216	(18)		79	(13)	
Other current assets	225	(95)		152	(81)	
Lease liabilities	176	—		165	—	
Defined benefit pension and other post-employment liabilities	925	—		1 023	—	
Other non-current liabilities	18	—		1	—	
Provisions	311	(73)		82	(87)	
Other current liabilities	326	(154)		300	(55)	
Other temporary differences	27	(28)		36	(14)	
Total before netting	6 568	(3 066)	3 502	3 848	(2 858)	990
Netting of deferred tax assets and liabilities	(2 734)	2 734	—	(2 576)	2 576	—
Total after netting	3 834	(332)	3 502	1 272	(282)	990

Movements in the net deferred tax balance during the year:

EURm	2022	2021	2020
1 January	990	1 562	4 734
Recognized in income statement, continuing operations	2 452	137	(2 961)
Recognized in other comprehensive income	56	(753)	(115)
Acquisitions through business combinations and disposals and others	2	(6)	7
Translation differences	2	50	(103)
31 December	3 502	990	1 562

Amount of temporary differences, tax losses carried forward and tax credits for which no deferred tax asset was recognized due to uncertainty of utilization:

EURm	2022	2021
Temporary differences	1 579	13 487
Tax losses carried forward	18 324	19 393
Tax credits	311	342
Total	20 214	33 222

Deferred tax assets are recognized to the extent it is probable that future taxable profit will be available against which the unused tax losses, unused tax credits and deductible temporary differences can be utilized in the relevant jurisdictions. At 31 December 2022, Nokia has recognized deferred tax assets of EUR 3.8 billion (EUR 1.3 billion at 31 December 2021).

In addition, at 31 December 2022, Nokia has unrecognized deferred tax assets of which majority relate to France. These deferred tax assets have not been recognized due to uncertainty regarding their utilization. A significant portion of the French unrecognized deferred tax assets are indefinite in nature and available against future French tax liabilities, subject to a limitation of 50% of annual taxable profits.

Nokia continually evaluates the probability of utilizing its deferred tax assets and considers both positive and negative evidence in its assessment. At 31 December 2021, Nokia concluded based on its assessment that it was not probable that it would have been able to utilize the unused tax losses, unused tax credits and deductible temporary differences in Finland, which were generated over a longer period including as a result of historical operating performance and integration costs in Finland related to the 2016 acquisition of Alcatel-Lucent. This conclusion was based on the weighting of objective negative evidence of cumulative taxable losses against more subjective positive evidence. The primary factors in this weighting were the more objective record of a pattern of historical financial performance compared to the more inherently subjective expectations regarding future financial performance in Finland.

In 2021 and 2022, Nokia generated accounting and taxable profit in Finland and there were improvements in financial performance compared to preceding periods. The changes arise from the underlying improvements in operating performance, including successful execution of the new Nokia strategy and improved competitiveness in Mobile Networks. These improvements are expected to be sustained in the upcoming years, as well as over the longer term. In addition, Nokia has determined that, in 2022, a pattern of material taxable profits was re-established in Finland. Nokia's re-established pattern of profitability together with Nokia's forecasts of future taxable profit in Finland provides positive evidence about its ability to utilize the unused tax losses and deductible temporary differences in Finland. At 31 December 2022, Nokia concluded based on its assessment that it is probable that it will be able to utilize the unused tax losses and deductible temporary differences and re-recognized deferred tax assets of EUR 2.5 billion in the consolidated statement of financial position.

In performing this assessment, Nokia has not applied any cut-off period, other than expiry under the relevant tax legislation. A significant portion of Finnish deferred tax assets are indefinite in nature and available fully against future Finnish tax liabilities. Due to the non-expiry of these assets, the sensitivity of future profit projections affects mainly the period of time over which the deferred tax assets are expected to be utilized.

Expiry of tax losses carried forward and unused tax credits:

EURm	2022			2021		
	Recognized	Unrecognized	Total	Recognized	Unrecognized	Total
Tax losses carried forward						
Within 10 years	1 344	1 247	2 591	132	2 508	2 640
Thereafter	–	4	4	–	3	3
No expiry	2 095	17 073	19 168	2 172	16 882	19 054
Total	3 439	18 324	21 763	2 304	19 393	21 697
Tax credits						
Within 10 years	85	286	371	32	325	357
Thereafter	47	4	51	49	4	53
No expiry	117	21	138	177	13	190
Total	249	311	560	258	342	600

Nokia has undistributed earnings of EUR 388 million (EUR 422 million in 2021) for which a deferred tax liability has not been recognized as these earnings will not be distributed in the foreseeable future.

12. Earnings per share

	2022 EURm	2021 EURm	2020 EURm
Profit or loss attributable to equity holders of the parent			
Continuing operations	4 201	1 632	(2 520)
Discontinued operations	49	(9)	(3)
Profit/(loss) for the year	4 250	1 623	(2 523)
	000s shares	000s shares	000s shares
Weighted average number of shares outstanding	5 614 182	5 630 025	5 612 418
Effect of potentially dilutive shares			
Performance shares	46 187	50 300	19 780
Restricted shares and other	9 651	3 910	3 884
Total effect of potentially dilutive shares	55 838	54 210	23 664
Adjusted weighted average number of shares	5 670 020	5 684 235	5 636 082
Earnings per share	EUR	EUR	EUR
Basic earnings per share			
Continuing operations	0.75	0.29	(0.45)
Discontinued operations	0.01	0.00	0.00
Profit/(loss) for the year	0.76	0.29	(0.45)
Diluted earnings per share			
Continuing operations	0.74	0.29	(0.45)
Discontinued operations	0.01	0.00	0.00
Profit/(loss) for the year	0.75	0.29	(0.45)

Basic earnings per share is calculated by dividing the profit or loss attributable to equity holders of the parent by the weighted average number of shares outstanding during the year. Diluted earnings per share is calculated by adjusting the profit or loss attributable to equity holders of the parent, and the weighted average number of shares outstanding, for the effects of all dilutive potential ordinary shares. Potential ordinary shares are excluded from the calculation of diluted earnings per share when they are determined to be antidilutive.

In 2020, the effect of potentially dilutive shares was excluded from the calculation of diluted earnings per share as it was determined to be antidilutive due to the loss from continuing operations.

13. Goodwill and intangible assets

EURm	Goodwill	Intangible assets	Total
Acquisition cost at 1 January 2021	6 182	9 187	15 369
Translation differences	307	325	632
Additions	–	15	15
Acquisitions through business combinations ⁽¹⁾	63	24	87
Disposals and retirements	–	(52)	(52)
Acquisition cost at 31 December 2021	6 552	9 499	16 051
Accumulated amortization and impairment charges at 1 January 2021	(1 108)	(7 234)	(8 342)
Translation differences	(13)	(243)	(256)
Disposals and retirements	–	47	47
Amortization	–	(449)	(449)
Accumulated amortization and impairment charges at 31 December 2021	(1 121)	(7 879)	(9 000)
Net book value at 1 January 2021	5 074	1 953	7 027
Net book value at 31 December 2021	5 431	1 620	7 051
Acquisition cost at 1 January 2022	6 552	9 499	16 051
Translation differences	247	249	496
Additions	–	49	49
Disposals and retirements	–	(19)	(19)
Acquisition cost at 31 December 2022	6 799	9 778	16 577
Accumulated amortization and impairment charges at 1 January 2022	(1 121)	(7 879)	(9 000)
Translation differences	(11)	(190)	(201)
Disposals and retirements	–	19	19
Amortization	–	(465)	(465)
Accumulated amortization and impairment charges at 31 December 2022	(1 132)	(8 515)	(9 647)
Net book value at 1 January 2022	5 431	1 620	7 051
Net book value at 31 December 2022	5 667	1 263	6 930

(1) In 2021, Nokia acquired 100% ownership interest in Zyzyx, Inc. Goodwill of this acquisition was allocated to the Network Infrastructure operating segment.

Net book value of intangible assets by type of asset⁽¹⁾:

EURm	2022	2021
Customer relationships	923	1 178
Patents and licenses	151	183
Technologies and IPR&D	83	133
Tradenames and other	106	126
Total	1 263	1 620

(1) The largest movements are due to amortization and translation differences, with the exception of Technologies and IPR&D, which included acquired technology EUR 24 million in 2021.

At 31 December 2022, the weighted average for the remaining amortization periods is approximately three years for customer relationships, four years for patents and licenses, two years for technologies and IPR&D, and four years for tradenames and others.

Goodwill

Nokia has allocated goodwill to the operating segments corresponding to groups of cash-generating units (CGUs) that are expected to benefit from goodwill in line with Nokia's operational and reporting structure. Refer to Note 5, Segment information.

Allocation of goodwill

The following table presents the allocation of goodwill to groups of CGUs at 31 December:

EURm	2022	2021
Network Infrastructure	2 812	2 690
Mobile Networks	2 284	2 191
Cloud and Network Services	571	550

Recoverable amounts

The recoverable amounts of the groups of CGUs were based on fair value less costs of disposal that was determined using a level 3 fair value measurement based on a discounted cash flow calculation. The cash flow projections used in calculating the recoverable amounts were based on financial plans approved by management covering an explicit forecast period of three years.

Seven additional years of cash flow projections subsequent to the explicit forecast period of three years reflect a gradual progression towards the steady state cash flow projections modeled in the terminal year. The terminal growth rate assumptions reflect long-term average growth rates for the industries and economies in which the groups of CGUs operate. The discount rates reflect current assessments of the time value of money and relevant market risk premiums reflecting risks and uncertainties for which the future cash flow estimates have not been adjusted. Other key variables in future cash flow projections include assumptions on estimated sales growth, gross margin and operating margin. All cash flow projections are consistent with market participant assumptions.

Terminal growth rate and post-tax discount rate applied in the impairment test for the groups of CGUs:

Key assumption %	Terminal growth rate		Post-tax discount rate	
	2022	2021	2022	2021
Network Infrastructure	1.6	1.4	9.0	7.7
Mobile Networks	1.3	1.2	7.7	7.7
Cloud and Network Services	1.8	1.6	7.0	6.9

The results of the impairment testing indicate adequate headroom for each group of CGUs in 2022.

14. Property, plant and equipment

EURm	Land, buildings, constructions and vessels	Machinery, equipment and other	Assets under construction	Total
Acquisition cost at 1 January 2021	1 265	3 135	137	4 537
Translation differences	53	88	7	148
Additions	27	333	214	574
Reclassifications	28	41	(69)	—
Disposals and retirements	(145)	(226)	(9)	(380)
Acquisition cost at 31 December 2021	1 228	3 371	280	4 879
Accumulated depreciation at 1 January 2021	(482)	(2 272)	—	(2 754)
Translation differences	(26)	(59)	—	(85)
Impairment charges	(14)	—	—	(14)
Disposals and retirements	114	216	—	330
Depreciation	(87)	(345)	—	(432)
Accumulated depreciation at 31 December 2021	(495)	(2 460)	—	(2 955)
Net book value at 1 January 2021	783	863	137	1 783
Net book value at 31 December 2021	733	911	280	1 924
Acquisition cost at 1 January 2022	1 228	3 371	280	4 879
Translation differences	15	8	3	26
Additions	55	361	166	582
Reclassifications	160	40	(200)	—
Disposals and retirements	(49)	(191)	(1)	(241)
Acquisition cost at 31 December 2022	1 409	3 589	248	5 246
Accumulated depreciation at 1 January 2022	(495)	(2 460)	—	(2 955)
Translation differences	(6)	(6)	—	(12)
Impairment charges	(33)	(12)	—	(45)
Disposals and retirements	46	185	—	231
Depreciation	(87)	(363)	—	(450)
Accumulated depreciation at 31 December 2022	(575)	(2 656)	—	(3 231)
Net book value at 1 January 2022	733	911	280	1 924
Net book value at 31 December 2022	834	933	248	2 015

15. Leases

Right-of-use assets

Right-of-use assets represent Nokia's right to use the underlying leased assets.

EURm	Buildings	Other	Total
Acquisition cost at 1 January 2021	1 106	180	1 286
Translation differences	47	3	50
Net additions ⁽¹⁾	209	76	285
Retirements	(44)	(36)	(80)
Acquisition cost at 31 December 2021	1 318	223	1 541
Accumulated depreciation at 1 January 2021	(386)	(95)	(481)
Translation differences	(15)	(2)	(17)
Impairment charges	(25)	–	(25)
Retirements	44	36	80
Depreciation	(151)	(63)	(214)
Accumulated depreciation at 31 December 2021	(533)	(124)	(657)
Net book value at 1 January 2021	720	85	805
Net book value at 31 December 2021	785	99	884
Acquisition cost at 1 January 2022	1 318	223	1 541
Translation differences	6	(3)	3
Net additions ⁽¹⁾	184	73	257
Retirements	(85)	(52)	(137)
Acquisition cost at 31 December 2022	1 423	241	1 664
Accumulated depreciation at 1 January 2022	(533)	(124)	(657)
Translation differences	3	1	4
Impairment charges	6	–	6
Retirements	85	52	137
Depreciation	(150)	(75)	(225)
Accumulated depreciation at 31 December 2022	(589)	(146)	(735)
Net book value at 1 January 2022	785	99	884
Net book value at 31 December 2022	834	95	929

(1) Net additions comprise new lease contracts as well as modifications and remeasurements of existing lease contracts.

Amounts recognized in the income statement⁽¹⁾

EURm	2022	2021	2020
Depreciation of right-of-use assets	(225)	(214)	(223)
Interest expense on lease liabilities	(26)	(24)	(25)
Impairment charges, net of reversals	6	(25)	(32)
Total	(245)	(263)	(280)

(1) Excluding certain other lease related amounts such as expenses relating to short-term leases, income from subleasing and gains arising from sale and leaseback transactions that are not material.

Amounts reported in the statement of cash flows

EURm	2022	2021	2020
Payment of principal portion of lease liabilities	(217)	(226)	(234)
Interest paid on lease liabilities	(26)	(24)	(25)
Total	(243)	(250)	(259)

The maturity analysis of lease liabilities is presented in Note 32, Financial risk management. Commitments related to future lease contracts are presented in Note 27, Commitments, contingencies and legal proceedings.

16. Inventories

EURm	2022	2021
Raw materials and semi-finished goods	1 075	673
Finished goods	1 375	1 039
Contract work in progress ⁽¹⁾	815	680
Total	3 265	2 392

(1) Contract work in progress comprises costs incurred to date for customer contracts where the contractual performance obligations are not yet satisfied. Contract work in progress will be recognized as cost of sales when the corresponding revenue is recognized.

The cost of inventories recognized as an expense during the year and included in cost of sales is EUR 8 623 million (EUR 6 427 million in 2021 and EUR 6 115 million in 2020).

The cost of inventories recognized as an expense includes EUR 267 million (EUR 203 million in 2021 and EUR 230 million in 2020) in respect of write-downs of inventory to net realizable value, and has been reduced by EUR 98 million (EUR 112 million in 2021 and EUR 98 million in 2020) in respect of the reversal of such write-downs. Previous write-downs have been reversed primarily as a result of changes in estimated customer demand.

17. Other receivables

Non-current

EURm	2022	2021
R&D tax credits and other indirect tax receivables	159	148
Deposits	45	47
Other	35	60
Total	239	255

Current

EURm	2022	2021
R&D tax credits, VAT and other indirect tax receivables	468	480
Prepayments related to contract manufacturing	62	22
IT-related prepaid expenses	41	42
Divestment-related receivables	26	23
Other	337	292
Total	934	859

18. Equity

Shares and share capital

Share capital

Nokia Corporation has one class of shares. Each share entitles the holder to one vote at general meetings. The shares have no par value nor is there a minimum or maximum share capital or number of shares under the Articles of Association of Nokia Corporation. At 31 December 2022, the share capital amounted to EUR 245 896 461.96 (EUR 245 896 461.96 in 2021) and consisted of 5 632 297 576 (5 675 461 159 in 2021) issued and fully paid shares. In 2022, Nokia Corporation issued without consideration in a directed share issue 20 800 000 new shares to itself to fulfill the company's obligations under the Nokia Equity Programs and canceled 63 963 583 shares it had repurchased during the year.

Share premium

Share premium reserve consists of the share premium account of the Parent Company. In addition, the equity impact corresponding to the employee services received related to the equity-settled share-based compensation plans is recorded in the share premium reserve.

Treasury shares

At 31 December 2022, the number of Nokia shares held by the Group companies was 45 281 539 (40 467 555 in 2021) representing 0.8% (0.7% in 2021) of the share capital and total voting rights.

In 2022, Nokia Corporation transferred without consideration 15 986 016 shares held by the company to employees, including certain members of the Group Leadership Team, as settlement of Nokia's equity-based incentive plans and the employee share purchase plan. In addition, Nokia repurchased 63 963 583 shares under the first phase of its share buyback program. The repurchased shares were canceled in December 2022.

Reconciliation of the number of shares outstanding at the beginning and at the end of the period:

Number of shares 000s	2022	2021	2020
1 January	5 634 993	5 617 496	5 605 581
Settlement of share-based payments	15 986	17 497	11 915
Acquisition of treasury shares	(63 963)	—	—
31 December	5 587 016	5 634 993	5 617 496

Authorizations given to the Board of Directors related to issue and repurchase of shares

Authorization to issue shares and special rights entitling to shares

At the Annual General Meeting held on 5 April 2022, the shareholders authorized the Board of Directors to issue a maximum of 550 million shares through one or more issues of shares or special rights entitling to shares. The Board of Directors is authorized to issue either new shares or shares held by Nokia. The authorization included the right for the Board of Directors to resolve on all the terms and conditions of such share and special rights issuances, including issuance in deviation from the shareholders' pre-emptive rights. The authorization may be used to develop Nokia's capital structure, diversify the shareholder base, finance or carry out acquisitions or other arrangements, settle Nokia's equity-based incentive plans, or for other purposes resolved by the Board of Directors. The authorization is effective until 4 October 2023, and it terminated the previous authorizations to issue shares and special rights entitling to shares.

Authorization to repurchase shares

At the Annual General Meeting held on 5 April 2022, the shareholders authorized the Board of Directors to repurchase a maximum of 550 million shares. The amount corresponds to less than 10% of the total number of Nokia's shares. Shares may be repurchased to be canceled, held to be reissued, transferred further or for other purposes resolved by the Board. The shares may be repurchased otherwise than in proportion to the shares held by the shareholders. The price paid for the shares under the authorization shall be based on the market price of Nokia shares on the securities markets on the date of the repurchase or a price otherwise formed in a competitive process. The Board shall resolve on all other matters related to the repurchase of Nokia shares. The authorization is effective until 4 October 2023, and it terminated the previous authorization to repurchase shares to the extent that the Board has not previously resolved to repurchase shares based on such authorization.

Distribution of funds

Nokia distributes funds to its shareholders in two ways: a) as dividends from retained earnings and/or as assets from the reserve for invested unrestricted equity, and b) by repurchasing its own shares using funds in the unrestricted equity. The amount of any distribution is limited to the amount of distributable earnings of the Parent Company, and subject to exceptions relating to the right of minority shareholders to request a certain minimum distribution, the distribution may not exceed the amount proposed by the Board of Directors.

Dividend and/or assets from the reserve for unrestricted invested equity

Nokia's Board of Directors proposes to the Annual General Meeting 2023 that no dividend is distributed by a resolution of the AGM for the financial year ended on 31 December 2022. Instead, the Board proposes to the AGM to be authorized to decide, in its discretion, on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity. The authorization would be used to distribute dividend and/or assets from the reserve for invested unrestricted equity in four quarterly installments during the period of validity of the authorization unless the Board decides otherwise for a justified reason. On the date of issuing the financial statements for 2022 the total number of Nokia shares is 5 632 297 576 and consequently the total amount of distribution would be EUR 676 million. Total number of shares includes the shares held by the Parent Company which are not entitled to distribution.

The AGM in 2022 resolved to authorize the Board of Directors to decide on the distribution of an aggregate maximum of EUR 0.08 per share as dividend and/or as assets from the reserve of invested unrestricted equity for the financial year 2021. The authorization was used to distribute dividend in four installments. During 2022, three installments of dividend were distributed amounting to EUR 0.06 per share and EUR 337 million in total. The fourth installment of EUR 0.02 was paid in February 2023. The AGM in 2021 resolved that no dividend is distributed for the financial year 2020.

Share buyback program

In February 2022, Nokia's Board of Directors initiated a share buyback program under the authorization from the AGM to repurchase shares. The program targets to return up to EUR 600 million of cash to shareholders in tranches over a period of two years. In the first phase, which was launched on 11 February 2022 and which ended on 11 November 2022, Nokia repurchased 63 963 583 shares corresponding to 1.1% of the total number of Nokia shares at 31 December 2021. The aggregate purchase price of all shares acquired in the first phase was EUR 300 million and the average price per share was EUR 4.69. The repurchased shares were canceled in December 2022.

In December 2022, Nokia's Board of Directors decided to launch the second phase of the share buyback program based on the authorization granted by Nokia's Annual General Meeting on 5 April 2022. The repurchases started on 2 January 2023 and will end at the latest by 21 December 2023. The aggregate purchase price of all shares to be acquired under the second phase of the program shall not exceed EUR 300 million. The maximum number of shares that can be repurchased is 275 000 000 shares corresponding to approximately 5% of the total number of shares in Nokia. The repurchases will be funded using funds in the reserve for invested unrestricted equity and hence the repurchases will reduce Nokia's total unrestricted equity. The repurchased shares will be canceled.

Nokia has appointed a third-party broker as the lead-manager for the second phase of the buyback program. The lead-manager will make trading decisions independently of and without influence from Nokia. Nokia may terminate the program prior to its scheduled end date with one trading day notice provided that it does not possess any inside information as defined in Article 7 of the Market Abuse Regulation (MAR).

Nature and purpose of other equity reserves

Translation differences

Translation differences consist of foreign exchange differences arising from translation of foreign operations into euro, the presentation currency of the consolidated financial statements, as well as gains and losses related to hedging of net investments in foreign operations.

Fair value and other reserves

Pension remeasurements

Pension remeasurements reserve includes actuarial gains and losses as well as return on plan assets and changes in the effect of the asset ceiling, excluding amounts recognized in net interest, related to Nokia's defined benefit plans.

Hedging reserve

Hedging reserve includes the change in fair value that reflects the change in spot exchange rates for certain foreign exchange forward contracts that are designated as cash flow hedges to the extent that the hedge is effective.

Cost of hedging reserve

Cost of hedging reserve includes forward element of foreign exchange forward contracts and the time value of foreign exchange options related to cash flow hedging of forecasted foreign currency sale and purchase transactions. Additionally, cost of hedging reserve includes the difference between the change in fair value of forward element of foreign exchange forward contracts and the time value of option contracts and the amortization of forward element of foreign exchange forward contracts and time value of option contracts related to net investment hedging. Cost of hedging reserve also includes changes in fair value from foreign currency basis spread related to fair value hedging of foreign currency denominated bonds.

Fair value reserve

Fair value reserve includes the changes in fair value of financial instruments that are managed in a portfolio with a business model of holding financial instruments to collect contractual cash flows including principal and interest as well as selling financial instruments. The fair value changes recorded in fair value reserve for these instruments are reduced by amounts of loss allowances.

Reserve for invested unrestricted equity

The reserve for invested unrestricted equity includes that part of the subscription price of issued shares that according to the share issue decision is not to be recorded to the share capital as well as other equity inputs that are not recorded to some other reserve. The amounts received for treasury shares are recorded to the reserve for invested unrestricted equity, unless it is provided in the share issue decision that it is to be recorded in full or in part to the share capital. The Nokia shares repurchased under the ongoing share buyback program are funded using funds in the reserve for invested unrestricted equity.

Other equity

Retained earnings/accumulated deficit

Retained earnings/accumulated deficit is the net total of previous years' profits and losses less dividends paid to the shareholders.

Non-controlling interests

Non-controlling interests represent the share of net assets of certain subsidiaries attributable to their minority shareholders. For more information on the contractual arrangement related to the ownership interests in the Nokia Shanghai Bell Group, refer to Note 30, Significant partly-owned subsidiaries.

Changes in other comprehensive income by component of equity

EURm	Translation differences	Fair value and other reserves			
		Pension remeasurements	Hedging reserve	Cost of hedging reserve	Fair value reserve
1 January 2020	(372)	1 457	(6)	(14)	(55)
Foreign exchange translation differences	(1 231)	—	—	—	—
Net investment hedging gains	307	—	—	1	—
Remeasurements of defined benefit plans	—	484	—	—	—
Net fair value gains/(losses)	—	—	13	(13)	(175)
Transfer to income statement	—	—	(5)	16	208
Other decrease	(1)	—	—	—	—
Movement attributable to non-controlling interests	2	(1)	—	—	—
31 December 2020	(1 295)	1 940	2	(10)	(22)
Foreign exchange translation differences	1 162	—	—	—	—
Net investment hedging losses	(249)	—	—	—	—
Remeasurements of defined benefit plans	—	2 302	—	—	—
Net fair value (losses)/gains	—	—	(15)	5	(25)
Transfer to income statement	(7)	—	6	4	32
Movement attributable to non-controlling interests	(7)	—	—	—	—
31 December 2021	(396)	4 242	(7)	(1)	(15)
Foreign exchange translation differences	697	—	—	—	—
Net investment hedging losses	(147)	—	—	—	—
Remeasurements of defined benefit plans	—	(349)	—	—	—
Net fair value gains/(losses)	—	—	24	(27)	(208)
Transfer to income statement	14	—	61	10	175
Movement attributable to non-controlling interests	1	—	—	—	—
31 December 2022⁽¹⁾	169	3 893	78	(18)	(48)

(1) In 2022, translation differences includes EUR 80 million gains (EUR 226 million gains in 2021 and EUR 475 million gains in 2020) related to net investment hedging.

Capital management

For capital management purposes Nokia defines capital as total equity and interest-bearing liabilities less cash and cash equivalents, current interest-bearing financial investments and non-current interest-bearing financial investments.

The main objectives of Nokia's capital management are to maintain a solid overall financial position and to ensure sufficient financial flexibility to execute Nokia's long-term business strategy and to provide returns to shareholders. From a cash perspective, Nokia aims to maintain the balance

of its cash and cash equivalents, interest-bearing financial investments less interest-bearing liabilities at 10-15% of annual net sales over time. This cash target replaces previous cash target to maintain a level of cash and cash equivalents and interest-bearing financial investments at 30% or more of annual net sales. To support these objectives, Nokia aims to maintain investment grade credit ratings. Nokia's current long-term credit ratings are BBB- (stable) by Fitch, Ba1 (stable) by Moody's, and BBB- (stable) by S&P Global Ratings. At 31 December 2022, Nokia's credit ratings were BBB- (stable) by Fitch, Ba2 (positive) by Moody's, and BB+ (positive) by S&P Global Ratings.

With regards to shareholder remuneration, Nokia targets recurring, stable and over time growing ordinary dividend payments, taking into account the previous year's earnings as well as the company's financial position and business outlook. Nokia is also using share repurchases as a tool to manage its capital structure through the reduction of capital and distribute excess cash to the shareholders.

19. Other comprehensive income

EURm	2022			2021			2020		
	Gross	Tax	Net	Gross	Tax	Net	Gross	Tax	Net
Pension remeasurements⁽¹⁾									
Remeasurements of defined benefit plans	(424)	77	(347)	3 040	(755)	2 285	624	(140)	484
Net change during the year	(424)	77	(347)	3 040	(755)	2 285	624	(140)	484
Translation differences									
Exchange differences on translating foreign operations	696	1	697	1 160	2	1 162	(1 232)	1	(1 231)
Transfer to income statement	14	—	14	(7)	—	(7)	—	—	—
Net change during the year	710	1	711	1 153	2	1 155	(1 232)	1	(1 231)
Net investment hedges⁽²⁾									
Net investment hedging (losses)/gains	(127)	(20)	(147)	(249)	—	(249)	266	42	308
Net change during the year	(127)	(20)	(147)	(249)	—	(249)	266	42	308
Cash flow and other hedges⁽³⁾									
Net fair value (losses)/gains	(15)	12	(3)	(10)	—	(10)	1	(1)	—
Transfer to income statement	98	(27)	71	10	—	10	14	(3)	11
Net change during the year	83	(15)	68	—	—	—	15	(4)	11
Financial assets at fair value through other comprehensive income									
Net fair value losses	(264)	56	(208)	(25)	—	(25)	(213)	38	(175)
Transfer to income statement on loss allowance	172	(34)	138	19	—	19	229	(46)	183
Transfer to income statement on disposal	46	(9)	37	13	—	13	31	(6)	25
Net change during the year	(46)	13	(33)	7	—	7	47	(14)	33
Other (decrease)/increase	(3)	—	(3)	—	—	—	3	—	3
Total	193	56	249	3 951	(753)	3 198	(277)	(115)	(392)

(1) In 2021, remeasurement of defined benefit plans includes the impact of the modification of the terms of the US defined benefit pension plans. For more information, refer to Note 24, Pensions and other post-employment benefits.

(2) In 2020, income tax related to net investment hedging gains includes EUR 94 million related to the derecognition of deferred tax assets in Finland. For more information, refer to Note 11, Income taxes.

(3) Includes movements in cash flow hedging reserve and related cost of hedging reserve.

20. Interest-bearing liabilities

Issuer/borrower	Instrument	Currency	Nominal (million)	Final maturity	Carrying amount EURm ⁽¹⁾	
					2022	2021
Nokia Corporation	2.00% Senior Notes	EUR	750	March 2024	736	759
Nokia Corporation	EIB R&D Loan	EUR	500	February 2025	500	500
Nokia Corporation	NIB R&D Loan ⁽²⁾	EUR	250	May 2025	250	250
Nokia Corporation	2.375% Senior Notes	EUR	500	May 2025	478	497
Nokia Corporation	2.00% Senior Notes	EUR	750	March 2026	716	760
Nokia Corporation	4.375% Senior Notes	USD	500	June 2027	436	464
Nokia of America Corporation	6.50% Senior Notes	USD	74	January 2028	70	66
Nokia Corporation	3.125% Senior Notes	EUR	500	May 2028	457	497
Nokia of America Corporation	6.45% Senior Notes	USD	206	March 2029	194	183
Nokia Corporation	6.625% Senior Notes	USD	500	May 2039	478	553
Nokia Corporation and various subsidiaries	Other liabilities				162	124
Total					4 477	4 653

(1) Carrying amount includes EUR 120 million of fair value losses (EUR 166 million of fair value gains in 2021) related to fair value hedge accounting relationships, including EUR 180 million of fair value gains (EUR 203 million in 2021) related to discontinued fair value hedge accounting relationships that are amortized over the life of the respective Senior Notes.

(2) The loan from the Nordic Investment Bank (NIB) is repayable in three equal annual installments in 2023, 2024 and 2025.

Nokia's significant credit facilities and funding programs at 31 December:

Committed / uncommitted	Financing arrangement	Currency	Nominal (million)	Utilized (million)	
				2022	2021
Committed	Revolving Credit Facility ⁽¹⁾	EUR	1 500	—	—
Uncommitted	Finnish Commercial Paper Programme	EUR	750	—	—
Uncommitted	Euro-Commercial Paper Programme	EUR	1 500	—	—
Uncommitted	Euro Medium Term Note Programme ⁽²⁾	EUR	5 000	2 500	2 500
Total				2 500	2 500

(1) The facility has its maturity in June 2026, except for EUR 88 million having its maturity in June 2024.

(2) All euro-denominated bonds have been issued under the Euro Medium Term Note Programme.

All borrowings and credit facilities presented in the tables above are senior unsecured and have no financial covenants.

To manage interest rate and foreign exchange risks related to Nokia's interest-bearing liabilities, Nokia has designated the following cross- currency swaps as hedges under both fair value hedge accounting and cash flow hedge accounting, and interest rate swaps as hedges under fair value hedge accounting at 31 December:

Entity	Instrument ⁽¹⁾	Currency	Maturity	Notional (million)		Fair value EURm	
				2022	2021	2022	2021
Nokia Corporation	Interest rate swaps	EUR	March 2024	750	185	(12)	—
Nokia Corporation	Interest rate swaps	EUR	May 2025	500	—	(17)	—
Nokia Corporation	Interest rate swaps	EUR	March 2026	750	—	(34)	—
Nokia Corporation	Cross-currency swaps	USD	June 2027	500	500	(26)	(7)
Nokia Corporation	Interest rate swaps	EUR	May 2028	500	—	(36)	—
Nokia Corporation	Cross-currency swaps	USD	May 2039	500	300	(97)	(46)
Total						(222)	(53)

(1) All cross-currency swaps and interest rate swaps are fixed-to-floating swaps.

Changes in lease liabilities, interest-bearing liabilities and associated derivatives arising from financing activities:

EURm	Long-term interest-bearing liabilities	Short-term interest-bearing liabilities	Derivatives held to hedge long-term borrowings ⁽¹⁾	Lease liabilities ⁽²⁾	Total
1 January 2021	5 015	561	154	910	6 640
Cash flows	(923)	(67)	13	(226)	(1 203)
Non-cash changes:					
Changes in foreign exchange rates	122	2	(104)	36	56
Changes in fair value	(53)	—	(10)	—	(63)
Reclassification between long-term and short-term	380	(380)	—	—	—
Net additions ⁽³⁾	—	—	—	296	296
Other	(4)	—	—	(7)	(11)
31 December 2021	4 537	116	53	1 009	5 715
Cash flows	(1)	27	7	(217)	(184)
Non-cash changes:					
Changes in foreign exchange rates	69	1	(57)	8	21
Changes in fair value	(282)	—	243	—	(39)
Reclassification between long-term and short-term	(84)	84	—	—	—
Net additions ⁽³⁾	—	—	—	242	242
Other	10	—	—	—	10
31 December 2022	4 249	228	246	1 042	5 765

(1) Includes derivatives designated in fair value and cash flow hedge accounting relationships as well as derivatives not designated in hedge accounting relationship but hedging identifiable long-term borrowing exposure.

(2) Includes non-current and current lease liabilities.

(3) Net additions comprise new lease contracts as well as modifications and remeasurements of existing lease contracts.

21. Fair value of financial instruments

Financial assets and liabilities recorded at fair value are categorized based on the amount of unobservable inputs used to measure their fair value. The three hierarchical levels used are based on an increasing amount of judgment associated with the inputs used to derive fair valuation for these assets and liabilities, level 1 being market values for exchange traded products, level 2 being primarily based on publicly available market information, and level 3 requiring most management judgment. At the end of each reporting period, Nokia categorizes its financial assets and liabilities to the appropriate level of fair value hierarchy. Items carried at fair value in the following table are measured at fair value on a recurring basis.

EURm	Carrying amounts					Fair value ⁽¹⁾	
	Amortized cost	Fair value through profit or loss			Fair value through other comprehensive income ⁽²⁾ Level 2	Total	Total
		Level 1	Level 2	Level 3			
2022							
Other non-current financial investments	—	5	—	823	—	828	828
Other non-current financial assets	183	—	91	—	27	301	301
Non-current interest-bearing financial investments	697	—	—	—	—	697	659
Other current financial assets	296	—	—	—	36	332	332
Derivative assets	—	—	239	—	—	239	239
Trade receivables	—	—	—	—	5 549	5 549	5 549
Current interest-bearing financial investments	1 447	—	1 633	—	—	3 080	3 080
Cash and cash equivalents	4 176	—	1 291	—	—	5 467	5 467
Total financial assets	6 799	5	3 254	823	5 612	16 493	16 455
Long-term interest-bearing liabilities	4 249	—	—	—	—	4 249	4 230
Other long-term financial liabilities	—	—	—	48	—	48	48
Short-term interest-bearing liabilities	228	—	—	—	—	228	228
Other short-term financial liabilities	75	—	—	502	—	577	577
Derivative liabilities	—	—	496	—	—	496	496
Discounts without performance obligations	539	—	—	—	—	539	539
Trade payables	4 730	—	—	—	—	4 730	4 730
Total financial liabilities	9 821	—	496	550	—	10 867	10 848

EURm	Carrying amounts					Fair value ⁽¹⁾	
	Amortized cost	Fair value through profit or loss			Fair value through other comprehensive income ⁽²⁾ Level 2	Total	Total
		Level 1	Level 2	Level 3			
2021							
Other non-current financial investments	—	8	—	750	—	758	758
Other non-current financial assets	130	—	101	—	94	325	325
Other current financial assets	115	—	—	—	21	136	136
Derivative assets	—	—	200	—	—	200	200
Trade receivables	—	—	—	—	5 382	5 382	5 382
Current interest-bearing financial investments	526	—	2 051	—	—	2 577	2 577
Cash and cash equivalents	4 627	—	2 064	—	—	6 691	6 691
Total financial assets	5 398	8	4 416	750	5 497	16 069	16 069
Long-term interest-bearing liabilities	4 537	—	—	—	—	4 537	4 775
Other long-term financial liabilities	—	—	—	68	—	68	68
Short-term interest-bearing liabilities	116	—	—	—	—	116	116
Other short-term financial liabilities	—	—	—	522	—	522	522
Derivative liabilities	—	—	240	—	—	240	240
Discounts without performance obligations	479	—	—	—	—	479	479
Trade payables	3 679	—	—	—	—	3 679	3 679
Total financial liabilities	8 811	—	240	590	—	9 641	9 879

- (1) The following fair value measurement methods are used for items not carried at fair value: The fair values of long-term interest-bearing liabilities, including current part, are primarily based on publicly available market information (level 2). The fair values of other assets and liabilities, including loan receivables and loans payable, are primarily based on discounted cash flow analysis (level 2). The fair value is estimated to equal the carrying amount for short-term financial assets and financial liabilities due to limited credit risk and short time to maturity. Refer to Note 2, Significant accounting policies.
- (2) No financial instruments measured at fair value through other comprehensive income are categorized in fair value hierarchy level 1 or level 3.

Lease liabilities are not included in the fair value of financial instruments.

The level 1 category includes financial assets and liabilities measured in whole by reference to published quotes in an active market. A financial instrument is regarded as quoted in an active market if quoted prices are readily and regularly available from an exchange, and those prices represent actual and regularly occurring market transactions on an arm's-length basis. This category includes only exchange traded products.

The level 2 category includes financial assets and liabilities measured using a valuation technique based on assumptions that are supported by prices from observable current market transactions. These include assets and liabilities with fair values based on publicly available market information, financial assets with fair values based on broker quotes and assets that are valued using Nokia's own valuation models where material assumptions are market observable. The majority of Nokia's cash equivalents, current interest-bearing financial investments, over-the-counter derivatives, trade receivables and certain other financial assets are included in this category.

The level 3 financial assets category includes a large number of investments in unlisted equities and unlisted venture funds, including investments managed by NGP Capital which specializes in growth-stage investing. The fair value of level 3 investments is determined using one or more valuation techniques where the use of the market approach generally consists of using comparable market transactions, while the use of the income approach generally consists of calculating the net present value of expected future cash flows. For unlisted funds, the selection of appropriate valuation techniques by the fund managing partner may be affected by the availability and reliability of relevant inputs. In some cases, one valuation technique may provide the best indication of fair value while in other circumstances multiple valuation techniques may be appropriate.

The inputs generally considered in determining the fair value of level 3 investments include the original transaction price, recent transactions in the same or similar instruments, completed or pending third-party transactions in the underlying investment or comparable issuers, subsequent rounds of financing, recapitalizations or other transactions undertaken by the issuer, offerings in the equity or debt capital markets, and changes in financial ratios or cash flows, adjusted as appropriate for liquidity, credit, market and/or other risk factors. The fair value may be adjusted to reflect illiquidity and/or non-transferability, with the amount of such discount estimated by the managing partner in the absence of market information.

The level 3 investments are remeasured at each reporting date taking into consideration any changes in estimates, projections and assumptions, as well as any changes in economic and other relevant conditions. Level 3 investments include approximately 50 separate venture funds investing in hundreds of individual companies in various sectors and geographies, focusing on 5G, digital health, software and enterprise sectors. Hence, specific estimates and assumptions used by managing partners in the absence of observable inputs do impact the fair value of individual investments, but no individual input has a significant impact on the aggregated fair value of level 3 investments.

Level 3 financial liabilities include a conditional obligation to China Huaxin as part of the Nokia Shanghai Bell definitive agreements where China Huaxin obtained the right to fully transfer its ownership interest in Nokia Shanghai Bell to the Group in exchange for a future cash settlement. The fair value of the liability is measured based on the expected future cash settlement. The measurement of the financial liability involves estimation of the option exercise price and the distribution of excess cash balances upon exercise. Unobservable valuation inputs include certain financial performance metrics of Nokia Shanghai Bell. No individual input has a significant impact on the total fair value of the level 3 financial liability. Refer to Note 30, Significant partly-owned subsidiaries.

Reconciliation of the opening and closing balances of level 3 financial assets and liabilities:

EURm	Level 3 financial assets	Level 3 financial liabilities
1 January 2021	727	(439)
Net gains/(losses) in income statement	177	(107)
Acquisitions through business combination	—	(48)
Additions ⁽¹⁾	69	—
Deductions ⁽¹⁾	(218)	7
Transfers out of level 3	(7)	—
Other movements	2	(3)
31 December 2021	750	(590)
Net gains in income statement	13	24
Additions ⁽¹⁾	101	—
Deductions ⁽¹⁾	(39)	20
Transfers out of level 3	(4)	—
Other movements	2	(4)
31 December 2022	823	(550)

(1) For level 3 financial assets, additions mainly include capital contributions to venture funds and deductions mainly include distributions from venture funds.

The gains and losses from venture fund and similar investments categorized in level 3 are included in other operating income and expenses. The gains and losses from other level 3 financial assets and liabilities are recorded in financial income and expenses. A net gain of EUR 23 million (EUR 85 million in 2021) related to level 3 financial instruments held at 31 December 2022 was included in the profit and loss during 2022.

22. Derivative and firm commitment assets and liabilities

EURm	Assets		Liabilities	
	Fair value ⁽¹⁾	Notional ⁽²⁾	Fair value ⁽¹⁾	Notional ⁽²⁾
2022				
Hedges on net investment in foreign subsidiaries				
Foreign exchange forward contracts	–	3 509	(9)	1 103
Cash flow hedges				
Foreign exchange forward contracts	77	1 775	(30)	1 034
Currency options bought	2	173	–	–
Fuel hedges	2	33	–	–
Fair value hedges				
Interest rate swaps	–	–	(99)	2 500
Foreign exchange forward contracts	19	393	(163)	1 981
Firm commitments	117	1 842	(28)	384
Cash flow and fair value hedges⁽³⁾				
Cross-currency swaps	–	–	(123)	938
Derivatives not designated in hedge accounting relationships carried at fair value through profit and loss				
Foreign exchange forward contracts	86	5 625	(72)	6 968
Currency options bought	–	18	–	–
Embedded derivatives ⁽⁴⁾	51	2 495	–	–
Other derivatives	2	5	–	–
Total	356	15 868	(524)	14 908
2021				
Hedges on net investment in foreign subsidiaries				
Foreign exchange forward contracts	1	1 568	(11)	1 394
Cash flow hedges				
Foreign exchange forward contracts	28	1 521	(47)	1 571
Currency options bought	–	7	–	–
Fair value hedges				
Interest rate swaps	–	185	–	–
Foreign exchange forward contracts	22	577	(80)	2 182
Firm commitments	58	2 069	(11)	397
Cash flow and fair value hedges⁽³⁾				
Cross-currency swaps	15	265	(68)	441
Derivatives not designated in hedge accounting relationships carried at fair value through profit and loss				
Foreign exchange forward contracts	74	6 432	(23)	6 390
Currency options bought	–	10	–	–
Other derivatives	2	25	–	–
Total	200	12 659	(240)	12 375

(1) Included in other current financial and firm commitment assets and other financial and firm commitment liabilities in the consolidated statement of financial position.

(2) Includes the gross amount of all notional values for contracts that have not yet been settled or canceled. The amount of notional value outstanding is not necessarily a measure or indication of market risk as the exposure of certain contracts may be offset by that of other contracts.

(3) Cross-currency swaps have been designated partly as fair value hedges and partly as cash flow hedges.

(4) Embedded derivatives are related to customer contracts.

23. Share-based payments

In 2022, the share-based payment expense for all equity-based incentive plans amounted to EUR 149 million (EUR 118 million in 2021 and EUR 76 million in 2020).

Active share-based payment plans by instrument

	Performance shares		Restricted shares	
	Number of performance shares outstanding at target	Weighted average grant date fair value EUR ⁽¹⁾	Number of restricted shares outstanding	Weighted average grant date fair value EUR ⁽¹⁾
1 January 2020	91 225 523		3 275 175	
Granted	38 753 394	2.63	3 830 700	3.06
Forfeited	(4 752 172)		(1 100 107)	
Vested ⁽²⁾	(25 754 552)		(1 478 175)	
31 December 2020	99 472 193		4 527 593	
Granted	17 749 650	5.11	25 046 200	5.05
Forfeited	(5 783 031)		(783 950)	
Vested ⁽²⁾	(31 611 804)		(2 026 150)	
31 December 2021	79 827 008		26 763 693	
Granted	12 661 300	3.49	32 238 100	4.15
Forfeited	(2 450 396)		(1 695 734)	
Vested ⁽²⁾	(26 290 064)		(2 778 431)	
31 December 2022	63 747 848		54 527 628	

(1) The fair value for the 2019 performance shares and all restricted shares are estimated based on the grant date market price of the Nokia share less the present value of dividends expected to be paid during the vesting period. The fair value for the 2020, 2021 and 2022 performance shares is estimated based on the dividend-adjusted price of the Nokia share at the end of the performance period of the plan and the target payout levels.

(2) Vested performance shares at target are multiplied by the confirmed payout (% of target) to calculate the total number of Nokia shares settlement.

Performance shares

In 2022, Nokia had outstanding Performance shares from grants made in 2019, 2020, 2021 and 2022. Shares granted under the 2019 Performance Share Plan vested 1 January 2022 and were settled soon thereafter. Starting in 2021, grants made for Performance shares were targeted on a more limited basis to senior level employees and executives.

The 2020, 2021, and 2022 Performance share grants have a three-year vesting period where Nokia's actual total shareholder return ("TSR") is compared to the target TSR to determine the number of Nokia shares that will be delivered at settlement. TSR is calculated based on the growth in the Nokia share price adjusted for any dividends resolved during the plan period. The 2020, 2021 and 2022 Performance share grants do not include a minimum payout guarantee.

Global performance share plans at 31 December 2022:

Plan	Performance shares outstanding at target	Confirmed payout (% of target)	Performance period	Settlement year
2019	—	53	2019-2021	2022
2020	34 192 094	—	2020-2023	2023
2021	16 957 154	—	2021-2023	2024
2022	12 598 600	—	2022-2024	2025

Restricted shares

In 2022, there were outstanding restricted shares from grants made in 2019, 2020, 2021 and 2022. Starting in 2021, Nokia has granted restricted shares to selected employees as the primary method of equity compensation. Restricted Shares represent a commitment by Nokia to deliver Nokia shares to eligible participants at a future point in time, subject to the fulfillment of predetermined service conditions. Restricted Shares will either vest on the third anniversary of the award or follow a tranche vesting schedule whereby each plan vests in one or more tranches determined at the award date. The restricted share grants are generally forfeited if the employment relationship with Nokia terminates prior to vesting of the applicable tranche or tranches.

Employee share purchase plan

Nokia offers a voluntary Employee Share Purchase Plan to its employees. Participating employees make contributions from their net salary to purchase Nokia shares on a monthly basis during a 12-month savings period. Nokia intends to deliver one matching share for every two purchased shares the employee holds as of the end of the Plan cycle. In 2022, 5 243 560 matching shares were issued as a settlement to the participants of the Employee Share Purchase Plan 2021 (4 851 070 matching shares issued under the 2020 Plan in 2021 and 6 340 859 matching shares issued under the 2019 Plan in 2020).

24. Pensions and other post-employment benefits

Defined contribution plans

In 2022, the amount recognized in the consolidated income statement related to defined contribution plans was EUR 241 million (EUR 223 million in 2021 and EUR 209 million in 2020).

Defined benefit pension plans

Nokia's most significant defined benefit pension plans are in the United States, Germany, and the United Kingdom. Together, they account for 91% of Nokia's total defined benefit obligation (91% in 2021) and 90% of Nokia's total fair value of plan assets (91% in 2021).

The defined benefit obligations, the fair value of plan assets, the effects of the asset ceiling and the net defined benefit balance at 31 December:

EURm	2022				2021			
	Defined benefit obligation	Fair value of plan assets	Effects of asset ceiling	Net defined benefit balance	Defined benefit obligation	Fair value of plan assets	Effects of asset ceiling	Net defined benefit balance
United States, Pension	(12 340)	17 726	—	5 386	(14 892)	20 987	—	6 095
United States, OPEB	(1 615)	637	—	(978)	(2 015)	759	—	(1 256)
Germany	(1 957)	1 179	—	(778)	(2 630)	1 295	—	(1 335)
United Kingdom	(730)	942	—	212	(1 235)	1 652	—	417
Other	(1 670)	2 207	(84)	453	(1 932)	2 435	(92)	411
Total	(18 312)	22 691	(84)	4 295	(22 704)	27 128	(92)	4 332

United States

Nokia has significant defined benefit pension plans and a significant post-employment welfare benefit plan (OPEB) providing post-employment healthcare benefits and life insurance coverage in the United States.

Defined Benefit Pension Plans

The defined benefit pension plans include both traditional service-based programs and cash-balance plans. Salaried, non-union-represented employees are covered by a cash-balance program. All other legacy programs, including legacy service-based programs, were frozen by 31 December 2009. For former employees who, when actively employed, were represented by a union, Nokia maintained two defined benefit pension plans, both of which are traditional service-based programs. On 31 December 2021, these two plans were merged.

Other Post-Employment Benefit Plan

The post-employment plan provides welfare benefits for certain retired former employees. Pursuant to an agreement with the Communications Workers of America (CWA) and the International Brotherhood of Electrical Workers (IBEW) unions, Nokia provides post-employment healthcare benefits and life insurance coverage for employees formerly represented by these two unions. That agreement was renewed in 2020 and the contract expires on 31 December 2027.

Germany

Nokia maintains two primary plans in Germany which cover the majority of active employees: the cash-balance plan Beitragsorientierter Altersversorgungsplan (BAP) for the Group's former Nokia employees and a similar cash-balance program (AVK Basis-/Matchingkonto) for the Group's former Alcatel-Lucent employees. Individual benefits are generally dependent on eligible compensation levels, ranking within the Group and years of service. These plans are partially funded defined benefit pension plans, the benefits being subject to a minimum return guaranteed by the Group. The funding vehicle for the BAP is the NSN Pension Trust e.V. The trust is legally separate from the Group and manages the plan assets in accordance with the respective trust agreements.

All other plans have been frozen or closed in prior years and replaced by the cash-balance plans. Benefits are paid in annual installments, as monthly retirement pension, or as a lump sum on retirement in an amount equal to accrued pensions and guaranteed interest.

United Kingdom

Nokia maintains one primary plan in the UK, "Nokia Retirement Plan for former NSN & ALU employees", which is the result of the 2019 merger of the legacy Nokia plan where the plan was merged and members' benefits were transferred to the legacy Alcatel-Lucent plan. The combined plan consists of both money purchase sections with Guaranteed Minimum Pension (GMP) underpin and final salary sections. All final salary sections are closed to future benefit accrual: the legacy Nokia plan closed on 30 April 2012 and the legacy Alcatel-Lucent plan on 30 April 2018. Individual benefits for final salary sections are dependent on eligible compensation levels and years of service. For the money purchase sections with GMP underpin, individual benefits are dependent on the greater of the value of GMP at retirement date or the pension value resulting from the individual's invested funds. Nokia engages the services of an external trustee service provider to manage all investments for the combined pension plan.

Impact on the consolidated financial statements

Movements in the defined benefit obligation, fair value of plan assets and the impact of the asset ceiling

The movements in the present value of the defined benefit obligation for the years ended 31 December:

EURm	2022				2021			
	United States pension	United States OPEB	Other pension	Total	United States pension	United States OPEB	Other pension	Total
1 January	(14 892)	(2 015)	(5 797)	(22 704)	(15 340)	(2 039)	(6 122)	(23 501)
Current service cost	(113)	—	(92)	(205)	(106)	—	(90)	(196)
Interest expense	(363)	(50)	(94)	(507)	(308)	(41)	(61)	(410)
Past service cost	—	—	2	2	(5)	—	22	17
Settlements	—	—	54	54	—	—	38	38
Total	(476)	(50)	(130)	(656)	(419)	(41)	(91)	(551)
Remeasurements:								
(Loss)/gain from change in demographic assumptions	—	(6)	2	(4)	(7)	6	(12)	(13)
Gain/(loss) from change in financial assumptions	2 689	398	1 447	4 534	640	82	267	989
Experience (loss)/gain	(159)	(12)	(149)	(320)	75	(1)	(44)	30
Total	2 530	380	1 300	4 210	708	87	211	1 006
Translation differences	(869)	(114)	54	(929)	(1 184)	(157)	(135)	(1 476)
Contributions from plan participants	—	(59)	(35)	(94)	—	(71)	(27)	(98)
Benefits paid	1 367	253	240	1 860	1 343	219	240	1 802
Other	—	(10)	11	1	—	(13)	127	114
Total	498	70	270	838	159	(22)	205	342
31 December	(12 340)	(1 615)	(4 357)	(18 312)	(14 892)	(2 015)	(5 797)	(22 704)
Weighted average duration of the defined benefit obligation (in years)	7.6	8.7	9.3	8.1	9.1	10.1	12.6	10.1

Present value of obligations includes EUR 14 330 million (EUR 16 788 million in 2021) of wholly funded obligations, EUR 3 009 million (EUR 4 723 million in 2021) of partly funded obligations and EUR 973 million (EUR 1 193 million in 2021) of unfunded obligations.

The movements in the fair value of plan assets for the years ended 31 December:

EURm	2022				2021			
	United States pension	United States OPEB	Other pension	Total	United States pension	United States OPEB	Other pension	Total
1 January	20 987	759	5 382	27 128	19 869	459	5 360	25 688
Interest income	517	18	87	622	411	12	56	479
Administrative expenses and interest on asset ceiling	(18)	—	(5)	(23)	(16)	—	(5)	(21)
Settlements	—	—	(44)	(44)	—	—	(42)	(42)
Total	499	18	38	555	395	12	9	416
Remeasurements:								
Return on plan assets, excluding amounts included in interest income	(3 577)	(110)	(959)	(4 646)	760	47	46	853
Total	(3 577)	(110)	(959)	(4 646)	760	47	46	853
Translation differences	1 271	38	(66)	1 243	1 625	50	159	1 834
Contributions:								
Employers	28	9	47	84	25	(6)	60	79
Plan participants	—	59	35	94	—	71	27	98
Benefits paid	(1 367)	(253)	(138)	(1 758)	(1 343)	(219)	(147)	(1 709)
Section 420 Transfer ⁽¹⁾	(117)	117	—	—	(348)	348	—	—
Other	2	—	(11)	(9)	4	(3)	(131)	(130)
Total	(183)	(30)	(133)	(346)	(37)	241	(33)	171
31 December	17 726	637	4 328	22 691	20 987	759	5 382	27 128

(1) Section 420 Transfer. Refer to Future cash flows section below.

The movements in the impact of the asset ceiling limitation for the years ended 31 December:

EURm	2022				2021			
	United States pension	United States OPEB	Other pension	Total	United States pension	United States OPEB	Other pension	Total
1 January	–	–	(92)	(92)	(1 125)	–	(70)	(1 195)
Interest expense	–	–	–	–	(22)	–	–	(22)
Remeasurements:								
Change in asset ceiling, excluding amounts included in interest expense	–	–	12	12	1 198	–	(17)	1 181
Translation differences	–	–	(4)	(4)	(51)	–	(5)	(56)
31 December	–	–	(84)	(84)	–	–	(92)	(92)

Net balances at 31 December:

EURm	2022				2021			
	United States pension	United States OPEB	Other pension	Total	United States pension	United States OPEB	Other pension	Total
31 December	5 386	(978)	(113)	4 295	6 095	(1 256)	(507)	4 332
Consisting of:								
Net Pension Assets	5 658	–	1 096	6 754	6 422	–	1 318	7 740
Net Pension Liabilities	(272)	(978)	(1 209)	(2 459)	(327)	(1 256)	(1 825)	(3 408)

Asset ceiling limitation

Nokia may recognize the surplus of a pension plan to the amount of economic benefit that the entity can realize, either through a refund or as a reduction in future contributions. In 2021, Nokia modified the terms of all three of its US defined benefit pension plans to provide that, in the event of a termination of the plan, any remaining balance in the pension fund, after settling plan liabilities, shall be distributed to Nokia. As a result of the adoption of this modification, Nokia recognized a reduction of EUR 1 369 million in the effect of the asset ceiling in 2021.

Movements in asset ceiling limitation are recognized directly in the consolidated statement of comprehensive income, excluding amounts included in interest expense. In 2022, Nokia recognized an asset ceiling limitation in the amount of EUR 84 million (EUR 92 million in 2021).

Recognized in the income statement

Recognized in the consolidated income statement for the years ended 31 December:

EURm	2022	2021	2020
Current service cost ⁽¹⁾	205	196	211
Past service cost ⁽¹⁾	(2)	(17)	(63)
Net interest ⁽²⁾	(92)	(26)	–
Settlements ⁽¹⁾	(10)	4	5
Total	101	157	153

(1) Included in operating expenses within the consolidated income statement.

(2) Included in financial expenses within the consolidated income statement.

Recognized in other comprehensive income

Recognized in other comprehensive income for the years ended 31 December:

EURm	2022	2021	2020
Return on plan assets, excluding amounts included in interest income	(4 646)	853	2 476
(Loss)/gain from change in demographic assumptions	(4)	(13)	288
Gain/(loss) from change in financial assumptions	4 534	989	(2 007)
Experience (loss)/gain	(320)	30	100
Change in asset ceiling, excluding amounts included in interest expense	12	1 181	(233)
Total	(424)	3 040	624

Actuarial assumptions and sensitivity analysis

Actuarial assumptions

Assumptions regarding future mortality are set based on actuarial advice in accordance with published statistics and experience in each country.

The discount rates and mortality tables used for the significant plans:

	Discount rate %		Mortality table
	2022	2021	
United States	4.9	2.4	Pri-2012 w/MP-2020 mortality projection scale Heubeck 2018G CMI 2021
Germany	3.7	0.9	
United Kingdom ⁽¹⁾	4.8	1.9	
Total weighted average for all countries	4.7	2.2	

(1) Tables are adjusted with 1.5% long-term rate of improvement.

The principal actuarial weighted average assumptions used for determining the defined benefit obligation and sensitivity of the defined benefit obligation to changes in these assumptions:

	2022	2021	Change in assumption	Increase in assumption ⁽¹⁾ EURm	Decrease in assumption ⁽¹⁾ EURm
Discount rate for determining present values	4.7%	2.2%	1.0%	1 319	(1 541)
Pension growth rate	2.2%	0.4%	1.0%	(261)	218
Inflation rate	2.1%	1.8%	1.0%	(235)	206
Life Expectancy	87-89 years	87-88 years	1 year	(758)	705

(1) Positive movement indicates a reduction in the defined benefit obligation; a negative movement indicates an increase in the defined benefit obligation.

Sensitivity analysis

When calculating the sensitivity of the defined benefit obligation to significant actuarial assumptions, the present value of the defined benefit obligation is calculated using the projected unit credit method. The sensitivity analyses are based on a change in an assumption while holding all other assumptions constant and may not be representative of the actual impact of changes. If more than one assumption is changed simultaneously, the combined impact of changes would not necessarily be the same as the sum of the individual changes. If the assumptions change to a different level compared with that presented, the effect on the defined benefit obligation may not be linear. Increases and decreases in the principal assumptions, which are used in determining the defined benefit obligation, do not have a symmetrical effect on the defined benefit obligation primarily due to the compound interest effect created when determining the net present value of the future benefit.

Investment strategies

The overall pension investment objective of Nokia is to preserve or enhance the defined benefit pension plans' funded status through the implementation of an investment strategy that maximizes return within the context of minimizing funded status risk. In formulating the asset allocation for the plans, multiple factors are considered, including, but not limited to, the long-term risk and return expectations for a variety of asset classes as well as current and multi-year projections of the defined benefit pension plans' demographics, benefit payments, contributions and funded status. Local trustee boards are responsible for conducting Asset-Liability Management (ALM) studies, when appropriate; overseeing the investment of plan assets; and monitoring and managing associated risks under company oversight and in accordance with local law. The results of the ALM framework are implemented on a plan level.

Nokia's pension investment managers may use derivative financial instruments including futures contracts, forward contracts, options and interest rate swaps to manage market risk. The performance and risk profile of investments is regularly monitored on a standalone basis as well as in the broader portfolio context. One risk is a decline in the plan's funded status as a result of the adverse performance of plan assets and/or defined benefit obligations. The application of the ALM study focuses on minimizing such risks.

Disaggregation of plan assets

EURm	2022				2021			
	Quoted	Unquoted	Total	%	Quoted	Unquoted	Total	%
Equity securities	1 086	—	1 086	5	1 359	—	1 359	5
Fixed income securities	16 070	164	16 234	71	18 732	164	18 896	70
Insurance contracts	—	790	790	4	—	981	981	4
Real estate	—	1 297	1 297	6	—	1 224	1 224	4
Short-term investments	482	—	482	2	1 646	—	1 646	6
Private equity and other	93	2 709	2 802	12	107	2 915	3 022	11
Total	17 731	4 960	22 691	100	21 844	5 284	27 128	100

United States plan assets

The majority of Nokia's United States pension plan assets are held in a master pension trust. The OPEB plan assets are held in two separate trusts. The Pension & Benefits Investment Committee formally approves the target allocation ranges every few years on the completion of the ALM study by external advisors and internal investment management. The overall United States pension plan asset portfolio, at 31 December 2022, reflects a balance of investments split of approximately 20/80 between equity, including alternative investments for this purpose, and fixed income securities.

Most short-term investments including cash, equities and fixed-income securities have quoted market prices in active markets. Equity securities represent investments in equity funds and direct investments, which have quoted market prices in an active market. Fixed income securities represent direct investments in government and corporate bonds, as well as investments in bond funds, which have quoted market prices in an active market. Insurance contracts are customary pension insurance contracts structured under domestic law in the respective countries. Real estate investments are investments in commercial properties or real estate funds, which invest in a diverse range of real estate properties. Short-term investments are liquid assets or cash, which are being held for a short period of time, with the primary purpose of controlling the tactical asset allocation. Private equity net asset values (NAVs) are determined by the asset managers based on inputs such as operating results, discounted future cash flows and market based comparable data. Assets invested in alternative asset classes such as private equity, real estate and absolute return, are measured using latest available valuations provided by the asset managers, reviewed by Nokia, and adjusted for subsequent cash flows.

Future cash flows

Contributions

Group contributions to the pension and other post-employment benefit plans are made to facilitate future benefit payments to plan participants. The funding policy is to meet minimum funding requirements as set forth in the employee benefit and tax laws, as well as any such additional amounts as Nokia may determine appropriate. Contributions are made to benefit plans for the sole benefit of plan participants. Employer contributions expected to be paid in 2023 total EUR 79 million.

United States

Funding methods

Funding requirements for the three United States qualified defined benefit pension plans are determined by the applicable statutes, namely the Employee Retirement Income Security Act of 1974 (ERISA), the Internal Revenue Code of 1986, and regulations issued by the Internal Revenue Service (IRS). In determining funding requirements, ERISA allows assets to be either market value or an average value over a period of time; and liabilities to be based on spot interest rates or average interest rates over a period of time. For the non-represented, represented and formerly represented defined benefit pension plans, Nokia does not foresee any future funding requirement for regulatory funding purposes, given the plans' asset allocation and the level of assets compared to liabilities.

Post-employment healthcare benefits for both non-represented and formerly union represented retirees are capped for those who retired on or before 1 March 1990. The benefit obligation associated with this group of retirees is 98% of the total United States retiree healthcare obligation at 31 December 2022. The US government's Medicare program is the primary payer for those aged 65 and older, comprising almost all uncapped retirees.

Section 420 transfers

Section 420 of the U.S. Internal Revenue Code (Section 420) allows for the transfer of pension assets in excess of specified thresholds above the plan's funding obligation (excess pension assets) to a retiree health benefits account, a retiree life insurance account, or both, maintained within the pension plan and to use the assets in such accounts to pay for, or to reimburse the employer for the cost of providing, applicable health or life insurance benefits, each as defined in Section 420, for retired employees, and with respect to health benefits, their spouses and dependents. Employers making such transfers are required to continue to provide healthcare benefits or life insurance coverage, as the case may be, for a certain period of time (cost maintenance period) at levels prescribed by regulations. Pursuant to Section 420, Nokia has transferred during 2022 EUR 117 million (EUR 348 million in 2021) in excess pension assets to cover the cost of retiree healthcare benefits and retiree life insurance coverage. Section 420 is currently set to expire on 31 December 2032.

Benefit payments

The following table summarizes expected benefit payments from the defined benefit pension plans and other post-employment benefit plans until 2032. Actual benefit payments may differ from expected benefit payments.

EURm	US Pension			US OPEB		Other countries	Total
	Management	Occupational	Supplemental plans	Formerly union represented	Non-union represented		
2023	1 282	243	27	100	58	297	2 007
2024	1 012	226	26	74	59	288	1 685
2025	963	213	25	67	60	291	1 619
2026	916	200	25	58	60	294	1 553
2027	869	186	24	51	60	292	1 482
2028-2032	3 652	747	105	348	303	1 563	6 718

Benefits are paid from plan assets where there is sufficient funding available to the plan to cover the benefit obligation. Any payments in excess of the plan assets are paid directly by Nokia. Direct benefit payments expected to be paid in 2023 total EUR 125 million.

25. Deferred revenue and other liabilities

Non-current

EURm	2022	2021
Deferred revenue ⁽¹⁾	—	305
Salaries, wages and social charges	46	46
Other	57	85
Total	103	436

Current

EURm	2022	2021
Deferred revenue ⁽¹⁾	—	155
Salaries, wages and social charges	1 669	1 780
VAT and other indirect taxes	328	349
Discounts without performance obligations	539	479
Accrued expenses related to customer projects	466	517
Other	617	660
Total	3 619	3 940

(1) In 2021, non-current deferred revenue of EUR 305 million and current deferred revenue of EUR 155 million related to an IP licensing contract which was determined to be a completed contract as defined in the transition guidance of IFRS 15, Revenue from Contracts with Customers. In December 2022, the licensee exercised a contractual option to extend the license agreement for the remaining life of the licensed patents, making it in substance a perpetual license. As a result, Nokia has recognized all the remaining revenue related to the License Agreement during the year. Refer to Note 6, Revenue recognition.

Other accruals include accrued logistics, research and development, IT, interest and royalty expenses, as well as various amounts that are individually insignificant.

26. Provisions

EURm	Restructuring	Warranty	Litigation and Environmental ⁽²⁾	Project losses	Other	Total
1 January 2022	312	254	251	235	517	1 569
Charged to income statement:						
Additions	125	156	61	26	284	652
Reversals	–	(57)	(12)	(2)	(98)	(169)
Total charged to income statement	125	99	49	24	186	483
Utilized during year ⁽¹⁾	(245)	(132)	(56)	(52)	(134)	(619)
Translation differences and other	1	–	9	–	(8)	2
31 December 2022	193	221	253	207	561	1 435
Non-current	63	20	153	138	248	622
Current	130	201	100	69	313	813

(1) The utilization of restructuring provision includes items transferred to accrued expenses, of which EUR 58 million remained in accrued expenses at 31 December 2022.

(2) Environmental provision was EUR 155 million at 31 December 2022 (EUR 149 million at 31 December 2021).

Restructuring provision

Nokia provides for the estimated cost to restructure when a detailed formal plan of restructuring has been completed, approved by management, and announced. Restructuring costs consist primarily of personnel restructuring charges. The other main components are costs associated with exiting real estate locations, and costs of terminating certain other contracts directly linked to the restructuring. At 31 December 2022, the restructuring provision amounted to EUR 193 million including personnel and other restructuring costs. The provision consists primarily of amounts related to the announcements made by Nokia on 25 October 2018 and 16 March 2021. The majority of the restructuring cash outflows is expected to occur over the next two years.

Warranty provision

Nokia provides for the estimated liability to repair or replace products under standard warranty at the time revenue is recognized. The provision estimate is based on historical experience of the level of repairs and replacements. Cash outflows related to the warranty provision are generally expected to occur within the next 18 months.

Litigation and environmental provisions

Nokia provides for the estimated future settlements related to legal proceedings based on the probable outcome of the claims. Nokia also provides for environmental remediation when Nokia becomes obliged, legally or constructively, to rectify environmental damage relating to soil, groundwater, surface water or sediment contamination. Cash outflows related to the litigation and environmental liabilities are inherently uncertain and generally occur over several periods. For a presentation of legal matters potentially affecting Nokia, refer to Note 27, Commitments, contingencies and legal proceedings.

Project loss provision

Nokia provides for onerous contracts based on the lower of the expected cost of fulfilling the contract and the expected cost of terminating the contract. An onerous contract is a contract in which the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under it. Project loss provisions relate to contracts with customers and are evaluated at a contract level. The majority of the project loss provision utilization is expected to occur over the next two years.

Other provisions

Nokia provides for various legal and constructive obligations such as material liability, indirect tax provisions, costs associated with exiting the Russian market, divestment-related provisions, employee-related provisions other than restructuring provisions and asset retirement obligations. Cash outflows related to other provisions are generally expected to occur over the next two years.

27. Commitments, contingencies and legal proceedings

Contractual obligations

EURm	Within 1 year	Between 1 and 3 years	Between 3 and 5 years	More than 5 years	Total
Purchase obligations at 31 December 2022 ⁽¹⁾	5 308	391	118	79	5 896

(1) Includes inventory purchase obligations, service agreements and outsourcing arrangements.

Additionally, Nokia has committed lease contracts that had not yet commenced at 31 December 2022. The future lease payments for these non-cancellable lease contracts are EUR 31 million within five years and EUR 192 million thereafter.

At 31 December 2022, Nokia has potential (undiscounted) future lease payments of EUR 807 million (EUR 718 million in 2021) relating to extension options not expected to be exercised and EUR 15 million (EUR 48 million in 2021) relating to termination options expected to be exercised that are not included in the lease liability.

Guarantees and other contingent commitments

EURm	2022	2021
Contingent liabilities on behalf of Group companies		
Guarantees issued by financial institutions		
Commercial guarantees ⁽¹⁾	1 238	1 281
Non-commercial guarantees	538	442
Corporate guarantees ⁽²⁾		
Commercial guarantees ⁽¹⁾	504	457
Non-commercial guarantees	32	35
Financing commitments		
Customer finance commitments ⁽³⁾	26	21
Venture fund commitments ⁽⁴⁾	433	137

- (1) In commercial guarantees, Nokia reports guarantees that are issued in the normal course of business to Nokia's customers for the performance of Nokia's obligations under supply agreements, including tender bonds, performance bonds and warranty bonds.
- (2) In corporate guarantees, Nokia reports guarantees with primary obligation that have been issued to Nokia's customers and other third parties.
- (3) Customer finance commitments are available under loan facilities negotiated with customers. Availability of the facility is dependent upon the borrower's continuing compliance with the agreed financial and operational covenants, and compliance with other administrative terms of the facility. The loan facilities are primarily available to fund capital expenditure relating to purchases of network infrastructure equipment and services. Refer to Note 32, Financial risk management.
- (4) As a limited partner in NGP Capital and certain other funds making technology-related investments, Nokia is committed to capital contributions and entitled to cash distributions according to the respective partnership agreements and underlying fund activities. In January 2022, Nokia agreed on capital commitment of USD 400 million to NGP Capital's Fund V. The fund's emphasis on companies developing emerging 5G use cases for industrial and business transformation aligns closely with Nokia's technology leadership vision and its efforts to maximize the value shift towards cloud. Per industry standard practice, the capital will be called throughout the 10 year lifecycle of the fund.

The amounts in the table above represent the maximum principal amount of commitments and contingencies, and these amounts do not reflect management's expected outcomes.

Legal matters

A number of Group companies are and will likely continue to be subject to various legal proceedings and investigations that arise from time to time, including proceedings regarding intellectual property, product liability, sales and marketing practices, commercial disputes, employment and wrongful discharge, antitrust, securities, health and safety, environmental, tax, international trade, privacy matters and compliance. As a result, Nokia may incur substantial costs that may not be covered by insurance and could affect business and reputation. While management does not expect any of the legal proceedings it is currently aware of to have a material adverse effect on Nokia's financial position, litigation is inherently unpredictable and Nokia may in the future incur judgments or enter into settlements that could have a material adverse effect on its profitability and cash flows.

Litigation and proceedings

Mass labor litigation in Brazil

Nokia is defending against a number of labor claims in various Brazilian labor courts. Plaintiffs are former employees whose contracts were terminated after Nokia exited from certain managed services contracts. The claims mainly relate to payments made under, or in connection with, the terminated labor contracts. Nokia has closed the majority of the court cases through settlement or judgment.

Asbestos litigation in the United States

Nokia is defending approximately 300 asbestos-related matters, at various stages of litigation. The claims are based on premises liability, products liability, and contractor liability. The claims also involve plaintiffs allegedly diagnosed with various diseases, including but not limited to asbestosis, lung cancer, and mesothelioma.

Intellectual property rights litigation

Continental

In 2019, Continental Automotive Systems (Continental) brought breach of FRAND (fair, reasonable and non-discriminatory terms) and antitrust claims against Nokia and others. The antitrust claims were dismissed with prejudice. In 2022, this decision became final after Continental lost on appeal and reconsideration requests. Continental also brought breach of contract and FRAND-related claims against Nokia in another US court in 2021. In the beginning of 2023, Nokia's motion to dismiss was granted in part and denied in part, and the action will proceed on the remaining claims at this time.

Oppo

In 2021, Nokia commenced patent infringement proceedings against Oppo, OnePlus and Realme in several countries in Asia and Europe. Across these actions, more than 30 patents are in suit, covering a mix of cellular standards and technologies such as connectivity, user interface and security. Oppo responded by filing invalidation actions against certain Nokia patents, a number of patent infringement actions against Nokia equipment in Germany, China and Finland and actions in China against Nokia relating to standard essential patent licensing issues. Nokia has had multiple patents confirmed as valid and infringed including in Germany, the Netherlands and the UK.

Vivo

In 2022, Nokia commenced patent infringement proceedings against Vivo in Germany and several countries in Asia. Vivo responded by filing a number of patent infringement actions against Nokia equipment in Germany and China. They also filed an action in China against Nokia relating to standard essential patent licensing issues.

28. Notes to the consolidated statement of cash flows

EURm	2022	2021	2020
Adjustments for⁽¹⁾			
Depreciation and amortization	1 140	1 095	1 132
Share-based payments	149	108	76
Impairment charges	152	40	246
Restructuring charges ⁽²⁾	125	183	454
Profit from other non-current financial investments	(27)	(188)	(61)
Profit on sale of property, plant and equipment, net	(35)	(59)	(3)
Share of results of associated companies and joint ventures	26	(9)	(26)
Financial income and expenses	28	240	167
Income tax (benefit)/expense	(2 030)	273	3 254
Other operating income and expenses	26	30	28
Total	(446)	1 713	5 267

(1) Includes continuing and discontinued operations.

(2) Adjustments represent the non-cash portion of the restructuring charges recognized in the consolidated income statement.

29. Principal Group companies

Company name	Country of incorporation	Parent holding %	Group ownership interest %
Nokia Solutions and Networks Oy	Finland	100.0	100.0
Nokia of America Corporation	United States	—	100.0
Nokia Shanghai Bell Co., Ltd. ⁽¹⁾	China	—	50.0
Nokia Solutions and Networks B.V.	Netherlands	—	100.0
Nokia Technologies Oy	Finland	100.0	100.0
Nokia Participations	France	—	100.0
Alcatel Lucent	France	—	100.0
Nokia Networks France	France	—	100.0
Nokia Solutions and Networks India Private Limited	India	—	100.0
Nokia Solutions and Networks Japan G.K.	Japan	—	100.0
Nokia Solutions and Networks Branch Operations Oy	Finland	—	100.0
Alcatel Submarine Networks	France	—	100.0
Nokia Arabia Limited	Saudi Arabia	—	100.0
Nokia Solutions and Networks do Brasil Telecomunicações Ltda.	Brazil	—	100.0
Nokia Solutions and Networks Taiwan Co., Ltd.	Taiwan	—	100.0
Nokia Spain, S.A.	Spain	—	100.0
Nokia UK Limited	United Kingdom	—	100.0
Nokia Solutions and Networks System Technology (Beijing) Co., Ltd. ⁽²⁾	China	—	50.0
Nokia Canada Inc.	Canada	—	100.0
Nokia Solutions and Networks Italia S.p.A.	Italy	—	100.0
Nokia Solutions and Networks Australia Pty Ltd	Australia	—	100.0

(1) Nokia Group owns 50% plus one share of Nokia Shanghai Bell Co., Ltd. with China Huaxin, an entity controlled by the Chinese government, holding the remaining ownership interests. Nokia Shanghai Bell Co., Ltd. is the parent company of the Nokia Shanghai Bell Group (NSB Group). Refer to Note 30, Significant partly-owned subsidiaries.

(2) Nokia Solutions and Network System Technology (Beijing) Co., Ltd. is a wholly owned subsidiary of Nokia Shanghai Bell Co., Ltd. and the Nokia Group has control over this subsidiary through its holding in the NSB Group.

30. Significant partly-owned subsidiaries

Nokia holds an ownership interest of 50% plus one share in Nokia Shanghai Bell's parent company, Nokia Shanghai Bell Co., Ltd. (NSB), with China Huaxin Post & Telecommunication Economy Development Center (China Huaxin) holding the remaining ownership interests. Nokia applied judgment to conclude that it is able to control NSB based on an assessment of various factors including the ability to nominate key management personnel, decision-making related to the management of NSB operations and Nokia's exposure to variable returns from NSB.

In 2017, Nokia entered into a contractual arrangement providing China Huaxin with the right to fully transfer its ownership interest in NSB to Nokia and Nokia with the right to purchase China Huaxin's ownership interest in NSB in exchange for a future cash settlement. To reflect this, Nokia derecognized the non-controlling interest balance related to NSB and recognized a financial liability based on the estimated future cash settlement to acquire China Huaxin's ownership interest. If the contractual arrangement expires unexercised on 1 July 2023, Nokia will derecognize the financial liability and record non-controlling interest equal to its share of NSB's net assets with any difference recorded within shareholders' equity.

The measurement of the financial liability is complex as it involves estimation of the option exercise price and the distribution of excess cash balances upon exercise. In 2022, Nokia recognized EUR 11 million gain (EUR 33 million loss in 2021) in financial income and expenses to reflect a change in the estimated future cash settlement. At 31 December 2022, the expected future cash settlement amounted to EUR 482 million (EUR 504 million in 2021).

Financial information for the Nokia Shanghai Bell Group⁽¹⁾:

EURm	2022	2021
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Summarized income statement

Net sales ⁽²⁾	1 316	1 174
Operating loss	(149)	(8)
Loss for the year	(148)	(24)
Loss for the year attributable to:		
Equity holders of the parent	(148)	(24)
Non-controlling interests ⁽³⁾	–	–

Summarized statement of financial position

Non-current assets	487	575
Non-current liabilities	(129)	(161)
Non-current net assets	358	414
Current assets ⁽⁴⁾	1 939	2 144
Current liabilities	(1 185)	(1 284)
Current net assets	754	860
Net assets⁽⁵⁾	1 112	1 274
Non-controlling interests ⁽³⁾	–	–

Summarized statement of cash flows

Net cash flows from operating activities	38	143
Net cash flows used in investing activities	(33)	0
Net cash flows used in financing activities	(4)	(82)
Translation differences	(8)	67
Net (decrease)/increase in cash and cash equivalents	(7)	128

(1) Financial information for the Nokia Shanghai Bell Group is presented before elimination of intercompany transactions with the rest of the Group but after elimination of intercompany transactions between entities within the Nokia Shanghai Bell Group.

(2) Includes EUR 29 million (EUR 61 million in 2021) net sales to other Group entities.

(3) Based on the contractual arrangement with China Huaxin, Nokia does not recognize any non-controlling interest in NSB.

(4) Includes a total of EUR 725 million (EUR 733 million in 2021) of cash and cash equivalents.

(5) The distribution of the profits of NSB requires the passing of a special resolution by more than two-thirds of its shareholders, subject to a requirement that at least 50% of the after-tax distributable profits are distributed as dividends each year.

31. Related party transactions

Nokia has related party transactions with pension funds, associated companies and joint ventures, and the management and the Board of Directors. Transactions and balances with companies over which Nokia exercises control are eliminated on consolidation. Refer to Note 2, Significant accounting policies, and Note 29, Principal Group companies.

Transactions with pension funds

Nokia has borrowings of EUR 37 million (EUR 40 million in 2021) from Nokia Unterstützungs-gesellschaft mbH, Nokia's German pension fund, a separate legal entity. The loan bears interest at the rate of 6% per annum and its duration is pending until further notice by the loan counterparties who have the right to terminate the loan with a 90-day notice. The loan is included in short-term interest-bearing liabilities in the consolidated statement of financial position. For more information on Nokia's pension plans, refer to Note 24, Pensions and other post-employment benefits.

Transactions with associated companies and joint ventures

EURm	2022	2021	2020
Sales	74	87	115
Purchases	(127)	(144)	(177)
Trade receivables	36	45	31
Trade payables	(26)	(29)	(26)

Investments in associated companies and joint ventures are individually immaterial.

Management compensation

Compensation information for the President and CEO:

EUR	Base salary/fee	Cash incentive payments	Share-based payment expenses ⁽¹⁾	Pension expenses	Total ⁽²⁾
2022					
Pekka Lundmark	1 300 000	2 342 438	5 425 169	406 806	9 474 413
2021					
Pekka Lundmark	1 300 000	2 975 781	4 263 505	589 873	9 129 159
2020					
Pekka Lundmark, from 1 August 2020	541 667	573 068	1 063 164	211 050	2 388 949
Rajeev Suri, until 31 July 2020 ⁽³⁾	759 365	945 697	1 276 825	341 591	3 323 478

(1) Represents the expense for all outstanding equity grants recorded during the year.

(2) Additionally, the CEO has received EUR 113 850 (EUR 35 731 in 2021 and EUR 80 244 in 2020) other compensation such as telephone, car, driver, mobility, tax compliance support and medical insurance.

(3) Upon stepping down from his role as CEO in 2020, Nokia recorded termination benefits, EUR 5 122 317, for Rajeev Suri according to terms of his exit agreement. During 2021, the details of Rajeev Suri's exit agreement were revised and an incentive payout factor was finalized, resulting into a credit of EUR 96 201 recorded to the income statement in 2021.

Total remuneration awarded to the Group Leadership Team for their time as members of the Group Leadership Team:

EURm	2022	2021	2020
Short-term benefits	17	20	27
Post-employment benefits ⁽¹⁾	1	2	2
Share-based payments	13	12	9
Termination benefits ⁽²⁾	1	—	10
Total	32	34	48

(1) The members of the Group Leadership Team participate in the local retirement programs applicable to employees in the country where they reside.

(2) Includes both termination payments and payments made under exceptional contractual arrangements for lapsed equity awards.

Board of Directors' compensation

The annual remuneration paid to the members of the Board of Directors, as decided by the Annual General Meetings in the respective years:

	2022			2021			2020		
	Annual fee ⁽¹⁾ EUR	Meeting fees ⁽²⁾ EUR	Shares received ⁽³⁾ number	Annual fee ⁽¹⁾ EUR	Meeting fees EUR	Shares received ⁽³⁾ number	Annual fee ⁽¹⁾ EUR	Meeting fees EUR	Shares received ⁽³⁾ number
Sari Baldauf, Chair	440 000	—	36 217	440 000	—	43 711	440 000	5 000	48 523
Søren Skou, Vice Chair ⁽⁴⁾	210 000	9 000	17 285	175 000	7 000	17 385	160 000	11 000	17 644
Bruce Brown ⁽⁴⁾⁽⁵⁾	210 000	17 000	17 285	200 000	7 000	19 868	190 000	22 000	20 953
Thomas Dannenfeldt ⁽⁴⁾⁽⁶⁾	200 000	9 000	16 462	185 000	7 000	18 378	175 000	—	19 299
Lisa Hook ⁽⁶⁾	185 000	7 000	15 227	—	—	—	—	—	—
Jeanette Horan ⁽⁵⁾⁽⁶⁾	195 000	—	16 050	185 000	7 000	18 378	175 000	20 000	19 299
Edward Kozel ⁽⁵⁾⁽⁶⁾	205 000	12 000	16 874	195 000	7 000	19 372	195 000	17 000	21 504
Elizabeth Nelson	—	—	—	—	—	—	175 000	17 000	19 299
Thomas Saueressig ⁽⁵⁾	180 000	7 000	14 816	—	—	—	—	—	—
Carla Smits-Nusteling ⁽⁶⁾	200 000	9 000	16 462	190 000	9 000	18 875	190 000	17 000	20 953
Olivier Piou	—	—	—	—	—	—	—	11 000	—
Kari Stadigh	—	—	—	200 000	7 000	19 868	185 000	11 000	20 401
Kai Öistämö ⁽⁵⁾	180 000	5 000	14 816	—	—	—	—	—	—
Total	2 205 000	75 000		1 770 000	51 000		1 885 000	131 000	

(1) Annual fees consist of Board member fees and Committee chair and member fees.

(2) Meeting fees include all meeting fees paid for the term that ended at the Annual General Meeting held on 5 April 2022, and meeting fees accrued and paid in 2022 for the term that began at the same meeting.

(3) Approximately 40% of each Board member's annual compensation is paid in Nokia shares purchased from the market, and the remaining approximately 60% is paid in cash.

(4) Annual fees in 2022 include EUR 30 000 for Bruce Brown as Chair and EUR 15 000 for Søren Skou and Thomas Dannenfeldt as members of the Personnel Committee.

(5) Annual fees in 2022 include EUR 20 000 for Edward Kozel as Chair and EUR 10 000 for Bruce Brown, Jeanette Horan, Thomas Saueressig, and Kai Öistämö as members of the Technology Committee.

(6) Annual fees in 2022 include EUR 30 000 for Carla Smits-Nusteling as Chair and EUR 15 000 for Thomas Dannenfeldt, Lisa Hook, Jeanette Horan, and Edward Kozel as members of the Audit Committee.

Transactions with the Group Leadership Team and the Board of Directors

No loans were granted to the members of the Group Leadership Team and the Board of Directors in 2022, 2021 or 2020.

Terms of termination of employment of the President and CEO

Rajeev Suri stepped down from his position as President and CEO on 31 July 2020. Nokia's Board of Directors appointed Pekka Lundmark as President and CEO of Nokia and he started in his new role on 1 August 2020.

The President and CEO, Pekka Lundmark, may terminate his service agreement at any time with 12 months' prior notice. The President and CEO would either continue to receive salary and benefits during the notice period or, at Nokia's discretion, a lump sum of equivalent value. Additionally, the President and CEO would be entitled to any short- or long-term incentives that would normally vest during the notice period. Any unvested equity awards would be forfeited after termination.

In the event that the President and CEO terminates his service agreement based on a final arbitration award demonstrating Nokia's material breach of the service agreement, he is entitled to a severance payment equaling up to 12 months of compensation, including annual base salary, benefits and target incentive. Any unvested equity awards would be forfeited after termination.

32. Financial risk management

General risk management principles

We have a systematic and structured approach to risk management. Key risks and opportunities are primarily identified against business targets either in business operations or as an integral part of strategy and financial planning. Risk management covers strategic, operational, financial, compliance and hazard risks. Key risks and opportunities are analyzed, managed and monitored as part of business performance management. The principles documented in the Nokia Enterprise Risk Management Policy, which is approved by the Audit Committee of the Board, require risk management and its elements to be integrated into key processes. One of the core principles is that the business or function head is also the risk owner, although all employees are responsible for identifying, analyzing and managing risks, as appropriate, given their roles and duties. Our overall risk management concept is based on managing the key risks that would prevent us from meeting our objectives, rather than focusing on eliminating risks. In addition to the principles defined in the Nokia Enterprise Risk Management Policy, other key policies and operating procedures reflect the implementation of specific aspects of risk management, including financial risk management.

Financial risks

The objective for treasury activities is to guarantee sufficient funding at all times and to identify, evaluate and manage financial risks. Treasury activities support this aim by mitigating the adverse effects on the profitability of the underlying business caused by fluctuations in the financial markets, and by managing the capital structure by balancing the levels of liquid assets and financial borrowings. Treasury activities are governed by the Nokia Treasury Policy approved by the President and CEO, which provides principles for overall financial risk management and determines the allocation of responsibilities for financial risk management activities. Operating procedures approved by the Chief Financial Officer (CFO) cover specific areas such as foreign exchange risk, interest rate risk, credit risk and liquidity risk as well as the use of derivative financial instruments in managing these risks. Nokia is risk averse in its treasury activities.

Financial risks are divided into market risk covering foreign exchange risk and interest rate risk; credit risk covering business-related credit risk and financial credit risk; and liquidity risk.

Market risk

Foreign exchange risk

Nokia operates globally and is exposed to transaction and translation foreign exchange risks. The objective of foreign exchange risk management is to mitigate adverse impacts from foreign exchange fluctuations on Nokia's profitability and cash flows. Treasury applies a global portfolio approach to manage foreign exchange risks within approved guidelines and limits.

Transaction risk arises from foreign currency denominated assets and liabilities together with foreign currency denominated future cash flows. Transaction exposures are managed in the context of various functional currencies of Group companies. Material transactional foreign exchange exposures are hedged, unless hedging would be uneconomical due to market liquidity and/or hedging cost. Exposures are defined using transaction nominal values. Exposures are mainly hedged with derivative financial instruments, such as foreign exchange forward contracts and foreign exchange options with most of the hedging instruments having a duration of less than a year.

Layered hedging approach is typically used for hedging of highly probable forecast foreign currency denominated cash flows with quarterly hedged items defined based on set hedge ratio ranges for each successive quarter. Hedged items defined for successive quarters are hedged with foreign exchange forward contracts and foreign exchange options with a hedge ratio of 1:1. Hedging level ranges are adjusted on a monthly basis including hedging instrument designation and documentation as appropriate. In case hedges exceed the hedge ratio range for any specific quarter, the hedge portfolio for that specific quarter is adjusted accordingly.

In certain cases, mainly related to long-term construction projects, Nokia applies fair value hedge accounting for foreign exchange risk with the objective to reduce the exposure to fluctuations in the fair value of the related firm commitments due to changes in foreign exchange rates. Exposures are mainly hedged with foreign exchange forward contracts with most of the hedging instruments matching the duration of the underlying projects. Nokia continuously manages the portfolio of hedging instruments to ensure appropriate alignment with the portfolio of hedged items at a hedging ratio of 1:1.

As Nokia has entities where the functional currency is other than the euro, the shareholders' equity is exposed to fluctuations in foreign exchange rates. Changes in shareholders' equity caused by movements in foreign exchange rates are shown as currency translation differences in the consolidated financial statements. The risk management strategy is to protect the euro counter value of the portion of this exposure expected to materialize as foreign currency repatriation cash flows in the foreseeable future. Exposures are mainly hedged with derivative financial instruments, such as foreign exchange forward contracts and foreign exchange options with most of the hedging instruments having a duration of less than a year. Hedged items are defined based on conservative expectations of repatriation cash flows based on a range of considerations. Net investment exposures are reviewed, hedged items designated, and hedging levels adjusted at minimum on a quarterly basis with a hedge ratio of 1:1. Additionally, hedging levels are adjusted whenever there are significant events impacting expected repatriation cash flows.

The foreign exchange risk arising from foreign currency denominated interest-bearing liabilities is primarily hedged using cross-currency swaps that are also used to manage Nokia's interest rate profile (refer to the interest rate risk section below).

Notional amounts in currencies that represent a significant portion of the currency mix in outstanding financial instruments and other hedged items at 31 December:

EURm	USD	CNY	JPY	INR
2022				
Foreign exchange exposure designated as hedged item for cash flow hedging, net ⁽¹⁾	854	(402)	311	(68)
Foreign exchange exposure designated as hedged item for fair value hedging for FX risk, net ⁽²⁾	1 458	—	—	—
Foreign exchange exposure designated as hedged item for net investment hedging ⁽³⁾	3 007	866	—	192
Foreign exchange exposure from interest-bearing liabilities ⁽⁴⁾	(758)	—	—	—
Foreign exchange exposure from items on the statement of financial position, excluding interest-bearing liabilities, net	(2 709)	(888)	204	(272)
Other foreign exchange derivatives, carried at fair value through profit and loss, net ⁽⁵⁾	4 214	892	(151)	(1 117)
EURm	USD	CNY	JPY	INR
2021				
Foreign exchange exposure designated as hedged item for cash flow hedging, net ⁽¹⁾	601	(484)	500	(219)
Foreign exchange exposure designated as hedged item for fair value hedging for FX risk, net ⁽²⁾	1 580	—	—	—
Foreign exchange exposure designated as hedged item for net investment hedging ⁽³⁾	1 540	920	—	201
Foreign exchange exposure from interest-bearing liabilities ⁽⁴⁾	(841)	—	—	—
Foreign exchange exposure from items on the statement of financial position, excluding interest-bearing liabilities, net	(1 602)	(938)	155	(404)
Other foreign exchange derivatives, carried at fair value through profit and loss, net ⁽⁵⁾	1 372	896	(109)	322

(1) Includes foreign exchange exposure from forecasted cash flows related to sales and purchases. In some currencies, especially the US dollar, Nokia has substantial foreign exchange exposures in both estimated cash inflows and outflows. These underlying exposures have been hedged.

(2) Includes foreign exchange exposure from contractual firm commitments. These underlying exposures have been substantially hedged.

(3) Includes net investment exposures in foreign operations. These underlying exposures have been hedged.

(4) Includes interest-bearing liabilities that have been hedged with cross-currency swaps and foreign exchange forwards. Refer to Note 20, Interest-bearing liabilities.

(5) Items on the statement of financial position are hedged by a portion of foreign exchange derivatives not designated in a hedge relationship and carried at fair value through profit and loss. Embedded derivatives are included in this line item.

The methodology for assessing foreign exchange risk exposures: Value-at-Risk

Nokia uses the Value-at-Risk (VaR) methodology to assess exposures to foreign exchange risks. The VaR-based methodology provides estimates of potential fair value losses in market risk-sensitive instruments as a result of adverse changes in specified market factors, at a specified confidence level over a defined holding period. Nokia calculates the foreign exchange VaR using the Monte Carlo method, which simulates random values for exchange rates in which Nokia has exposures and takes the non-linear price function of certain derivative instruments into account. The VaR is determined using volatilities and correlations of rates and prices estimated from a sample of historical market data, at a 95% confidence level, using a one-month holding period. To put more weight on recent market conditions, an exponentially weighted moving average is performed on the data with an appropriate decay factor. This model implies that, within a one-month period, the potential loss will not exceed the VaR estimate in 95% of possible outcomes. In the remaining 5% of possible outcomes, the potential loss will be at minimum equal to the VaR figure and, on average, substantially higher. The VaR methodology relies on a number of assumptions, which include the following: risks are measured under average market conditions, changes in market risk factors follow normal distributions, future movements in market risk factors are in line with estimated parameters and the assessed exposures do not change during the holding period. Thus, it is possible that, for any given month, the potential losses at a 95% confidence level are different and could be substantially higher than the estimated VaR.

The VaR calculation includes foreign currency denominated monetary financial instruments, such as current financial investments, loans and trade receivables, cash, loans and trade payables; foreign exchange derivatives carried at fair value through profit and loss that are not in a hedge relationship and are mostly used to hedge the statement of financial position foreign exchange exposure, as well as embedded derivatives; and foreign exchange derivatives designated as forecasted cash flow hedges, fair value hedges and net investment hedges as well as the exposures designated as hedged items for these hedge relationships.

The VaR risk measures for Nokia's sensitivity to foreign exchange risks are presented in the Total VaR column and the simulated impact to financial statements presented in profit, other comprehensive income (OCI) and cumulative translation adjustment (CTA) columns in the table below.

EURm	2022				2021			
	Total VaR	Simulated impact on financial statements			Total VaR	Simulated impact on financial statements		
		Profit	OCI	CTA		Profit	OCI	CTA
31 December	38	40	33	–	11	12	31	–
Average for the year	31	36	48	–	7	12	19	–
Range for the year	12-67	17-59	31-70	0-0	4-13	10-15	14-31	0-0

Interest rate risk

Nokia is exposed to interest rate risk either through market value fluctuations of items on the consolidated statement of financial position (price risk) or through changes in interest income or expenses (refinancing or reinvestment risk). Interest rate risk mainly arises through interest-bearing liabilities and assets. Estimated future changes in cash flows and the structure of the consolidated statement of financial position also expose Nokia to interest rate risk.

The objective of interest rate risk management is to mitigate adverse impacts arising from interest rate fluctuations on the consolidated income statement, cash flow, and financial assets and liabilities while taking into consideration Nokia's target capital structure and the resulting net interest rate exposure. Nokia has entered into long-term borrowings mainly at fixed rates and swapped a portion of them into floating rates, in line with a defined target interest profile. Nokia has not entered into interest rate swaps where it would be paying fixed rates. Nokia aims to mitigate the adverse impacts from interest rate fluctuations by continuously managing net interest rate exposure arising from financial assets and liabilities, by setting appropriate risk management benchmarks and risk limits.

Interest rate profile of items under interest rate risk management at 31 December:

EURm	2022		2021	
	Fixed rate	Floating rate ⁽¹⁾	Fixed rate	Floating rate ⁽¹⁾
Non-current interest-bearing financial investments	697	–	–	–
Current interest-bearing financial investments	912	2 168	182	2 395
Cash and cash equivalents	346	5 121	499	6 192
Interest-bearing liabilities	(3 658)	(819)	(3 871)	(782)
Financial assets and liabilities before derivatives	(1 703)	6 470	(3 190)	7 805
Interest rate derivatives	3 216	(3 216)	838	(838)
Financial assets and liabilities after derivatives	1 513	3 254	(2 352)	6 967

(1) All cash equivalents and derivative transaction-related collaterals with initial maturity of three months or less are considered floating rate for the purposes of interest rate risk management.

Treasury monitors and manages interest rate exposure centrally. Nokia uses selective sensitivity analyses to assess and measure interest rate exposure arising from interest-bearing assets, interest-bearing liabilities and related derivatives. Sensitivity analysis determines an estimate of potential fair value changes in market risk-sensitive instruments by varying interest rates in currencies in which Nokia has material amounts of financial assets and liabilities while keeping all other variables constant. Sensitivities to credit spreads are not reflected in the numbers.

Nokia's sensitivity to interest rate exposure in the investment and debt portfolios is presented in the fair value column in the table below with simulated impact to financial statements presented in profit and OCI columns.

EURm	2022			2021		
	Impact on fair value ⁽¹⁾	Impact on profit	Impact on OCI	Impact on fair value	Impact on profit	Impact on OCI
Interest rates – increase by 100 basis points	(2)	3	(1)	140	1	2
Interest rates – decrease by 100 basis points ⁽²⁾	4	(2)	(1)	(163)	(1)	(3)

(1) In 2022, bonds issued by Nokia Corporation have been fully swapped from fixed to floating resulting in significant decrease in impact on fair value.

(2) In 2022, Nokia has updated the analysis of interest rate sensitivity to equal shift for increase and decrease due to changes in the interest rate environment. Comparative numbers have been adjusted accordingly.

Effects of hedge accounting on the financial position and performance

Nokia is using several types of hedge accounting programs to manage its foreign exchange and interest rate risk exposures; refer to Note 2, Significant accounting policies. The effect of these programs on Nokia's financial position and performance at 31 December:

EURm	Cash flow hedges ⁽¹⁾	Net investment hedges ⁽¹⁾	Fair value hedges for FX risk ⁽¹⁾	Fair value and cash flow hedges ⁽¹⁾
2022				
Carrying amount of hedging instruments	46	(9)	(145)	(247)
Notional amount of hedging instruments	(1 350)	(4 299)	(1 456)	3 438
Notional amount of hedged items	1 353	4 299	1 458	(3 438)
Change in intrinsic value of hedging instruments since 1 January	(12)	(126)	(111)	(265)
Change in value of hedged items used to determine hedge effectiveness	20	126	112	262
2021				
Carrying amount of hedging instruments	(19)	(11)	(57)	(54)
Notional amount of hedging instruments	(1 196)	(2 949)	(1 579)	891
Notional amount of hedged items	1 201	2 949	1 577	(891)
Change in intrinsic value of hedging instruments since 1 January	(43)	(249)	(95)	(25)
Change in value of hedged items used to determine hedge effectiveness	40	249	92	25

(1) No significant ineffectiveness has been recorded during the periods presented and economic relationships have been fully effective.

The most significant foreign exchange hedging instruments under cash flow, net investment and fair value hedge accounting at 31 December:

	Currency	Fair value (EURm)	Weighted average hedged rate	Total	Maturity breakdown of notional amounts (EURm) ⁽¹⁾			
					Within 3 months	Between 3 and 12 months	Between 1 and 3 years	Beyond 3 years
2022								
Cash flow hedge accounting								
	GBP	5	0.8593	(235)	(76)	(159)	—	—
	JPY	5	138.8404	(235)	(66)	(169)	—	—
	USD	22	1.0394	(1 261)	(347)	(914)	—	—
	USD	12	1.0868	423	—	193	217	13
Net investment hedge accounting								
	CNY	(8)	7.4193	(866)	(866)	—	—	—
	USD	(3)	1.0563	(3 007)	(3 007)	—	—	—
Fair value hedge accounting for FX risk								
	USD	(145)	1.1358	(1 456)	(448)	(213)	(787)	(8)
2021								
Cash flow hedge accounting								
	GBP	(4)	0.8574	(209)	(55)	(154)	—	—
	GBP	4	0.8570	203	(6)	92	110	7
	JPY	(1)	130.3819	(392)	(100)	(292)	—	—
	USD	(25)	1.1586	(1 042)	(358)	(684)	—	—
	USD	14	1.1643	457	6	201	235	15
Net investment hedge accounting								
	CNY	(4)	7.2106	(920)	(920)	—	—	—
	INR	(4)	85.8900	(201)	(201)	—	—	—
	USD	1	1.1290	(1 540)	(1 540)	—	—	—
Fair value hedge accounting for FX risk								
	USD	(61)	1.1689	(1 580)	(73)	(238)	(1 130)	(139)

(1) Negative notional amounts indicate that hedges sell currency, and positive notional amounts indicate that hedges buy currency.

For information on the impact of hedge accounting on equity, refer to Note 18, Equity. For information on hedging instruments used for fair value and cash flow hedge accounting related to Nokia's interest-bearing liabilities, refer to Note 20, Interest-bearing liabilities. For information on derivative instruments, refer to Note 22, Derivative and firm commitment assets and liabilities.

Credit risk

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to Nokia. Credit risk arises from credit exposures to customers, including outstanding receivables, financial guarantees and committed transactions, as well as financial institutions, including bank and cash, fixed income and money market investments, and derivative financial instruments. Credit risk is managed separately for business-related and financial credit exposures.

Business-related credit risk

Nokia aims to ensure the highest possible quality in trade receivables and contract assets as well as customer or third-party loan receivables. The Credit Risk Management Standard Operating Procedure, approved by the CFO, lays out the framework for the management of the business-related credit risks. The Credit Risk Management Standard Operating Procedure sets out that credit decisions are based on credit evaluation in each business, including credit rating and limits for larger exposures, according to defined principles. Group level limit approvals are required for material credit exposures. Credit risks are monitored in each business and, where appropriate, mitigated on a case-by-case basis with the use of letters of credit, collaterals, sponsor guarantees, credit insurance, and sale of selected receivables.

Nokia's payment terms are 80 days on average. Credit exposure is measured as the total of trade receivables, contract assets and loans outstanding from customers and committed credits. Trade receivables do not include any major concentrations of credit risk by customer. The top three customers account for 4.5%, 3.5% and 3.3% (5.6%, 5.5% and 3.2% in 2021) of trade receivables, contract assets and loans due from customers and other third parties at 31 December 2022. The top three credit exposures by country account for 14.7%, 10.8% and 7.3% (17.6%, 9.3% and 8.4% in 2021) of Nokia's trade receivables, contract assets and loans due from customers and other third parties at 31 December 2022. The 14.7% relates to credit exposure in the United States (17.6% in 2021 from the United States).

The total of trade receivables, contract assets and loans due from customers is EUR 7 456 million (EUR 7 084 million in 2021) and customer financing related loan commitments undrawn is EUR 26 million (EUR 21 million in 2021) at 31 December 2022.

The aging of trade receivables, contract assets and customer finance loans at 31 December 2022:

EURm	Current	Past due 1-30 days	Past due 31-180 days	Past due More than 180 days	Total
Trade receivables	5 117	210	267	355	5 949
Contract assets	1 203	—	—	—	1 203
Customer financing related loan receivables	212	8	5	79	304
Total gross receivables	6 532	218	272	434	7 456
Expected credit loss allowance ⁽¹⁾	(361)	(15)	(65)	(203)	(644)
Total net receivables	6 171	203	207	231	6 812

(1) The total expected credit loss allowance includes EUR 311 million of credit-impaired assets relating to certain emerging market customers.

The expected credit loss allowance and amount charged to the consolidated income statement for trade receivables, contract assets and customer financing related loan receivables for the years ended 31 December:

EURm	2022	2021	2020
Expected credit loss allowance ⁽¹⁾	644	444	434
Expected credit loss charged to income statement	160	10	211

(1) In 2022, the expected credit loss allowance includes EUR 33 million transferred from other provisions.

Financial credit risk

Financial instruments contain an element of risk resulting from changes in the market price due to counterparties becoming less creditworthy or risk of loss due to counterparties being unable to meet their obligations. Financial credit risk is measured and monitored centrally by Treasury. Financial credit risk is managed actively by limiting counterparties to a sufficient number of major banks and financial institutions, and by monitoring the creditworthiness and the size of exposures continuously. Additionally, Nokia enters into netting arrangements with all major counterparties, which give the right to offset in the event that the counterparty would not be able to fulfill its obligations. Nokia enters into collateral agreements with certain counterparties, which require counterparties to post collateral against derivative receivables.

Investment decisions are based on strict creditworthiness and maturity criteria as defined in the Treasury-related policies and procedures. As a result of this investment policy approach and active management of outstanding investment exposures, Nokia has not been subject to any material credit losses in its financial investments in the years presented. Due to the high credit quality of Nokia's financial investments, the expected credit loss for these investments is deemed insignificant based on 12 months' expected credit losses at 31 December 2022.

Outstanding non-current and current interest-bearing financial investments, cash equivalents and cash classified by credit rating grades ranked in line with S&P Global Ratings categories at 31 December:

EURm	Rating ⁽¹⁾	Cash	Due within 3 months	Due between 3 and 12 months	Due between 1 and 3 years	Due between 3 and 5 years	Due beyond 5 years	Total ⁽²⁾⁽³⁾
2022								
	AAA	—	1 046	—	—	—	—	1 046
	AA+ - AA-	683	643	250	—	—	—	1 576
	A+ - A-	1 553	2 314	865	190	234	203	5 359
	BBB+ - BBB-	39	477	52	291	197	70	1 126
	Other	123	6	—	—	8	—	137
Total		2 398	4 486	1 167	481	439	273	9 244
2021								
	AAA	—	1 819	—	—	—	—	1 819
	AA+ - AA-	1 073	567	—	—	—	—	1 640
	A+ - A-	1 534	2 376	371	125	229	—	4 635
	BBB+ - BBB-	180	879	2	—	—	—	1 061
	Other	101	12	—	—	—	—	113
Total		2 888	5 653	373	125	229	—	9 268

(1) Bank Parent Company ratings are used here for bank groups. Actual bank subsidiary ratings may differ from the Bank Parent Company rating.

(2) Non-current and current interest-bearing financial investments and cash equivalents include bank deposits, structured deposits, investments in money market funds and investments in fixed income instruments.

(3) Instruments that include a call feature have been presented at their final maturities. Instruments that are contractually due beyond three months include EUR 551 million (EUR 424 million in 2021) of instruments that have a call period of less than three months.

Nokia has restricted bank deposits primarily related to employee benefits of EUR 122 million (EUR 119 million in 2021) that are presented in other non-current financial assets. Nokia has assessed the counterparty credit risk for these financial assets and concluded that expected credit losses are not significant.

The following table sets out financial assets and liabilities subject to offsetting under enforceable master netting agreements and similar arrangements at 31 December. To reconcile the items shown in the table below to the consolidated statement of financial position, items that are not subject to offsetting would need to be included, refer to Note 22, Derivative and firm commitment assets and liabilities.

EURm	Net amounts of financial assets/ (liabilities) presented in the statement of financial position	Related amounts not set off in the statement of financial position		Net amount
		Financial instruments assets/(liabilities)	Cash collateral (received)/pledged	
2022				
Derivative assets	182	(158)	(20)	4
Derivative liabilities	(496)	158	327	(11)
Total	(314)	—	307	(7)
2021				
Derivative assets	139	(102)	(26)	11
Derivative liabilities	(229)	102	126	(1)
Total	(90)	—	100	10

The financial instruments subject to enforceable master netting agreements and similar arrangements are not offset in the consolidated statement of financial position as there is no intention to settle net or realize the asset and settle the liability simultaneously.

Liquidity risk

Liquidity risk is defined as financial distress or extraordinarily high financing costs arising from a shortage of liquid funds in a situation where outstanding debt needs to be refinanced or where business conditions unexpectedly deteriorate and require financing. Transactional liquidity risk is defined as the risk of executing a financial transaction below fair market value or not being able to execute the transaction at all within a specific period of time. The objective of liquidity risk management is to maintain sufficient liquidity, and to ensure that it is readily available without endangering its value in order to avoid uncertainty related to financial distress at all times.

Nokia aims to secure sufficient liquidity at all times through efficient cash management and by investing primarily in highly liquid money market investments. Depending on its overall liquidity position, Nokia may pre-finance or refinance upcoming debt maturities before contractual maturity dates. The transactional liquidity risk is minimized by entering into transactions where proper two-way quotes can be obtained from the market. Nokia aims to ensure flexibility in funding by maintaining committed and uncommitted credit lines. Refer to Note 20, Interest-bearing liabilities.

The following table presents an undiscounted, contractual cash flow analysis for lease liabilities, financial liabilities and financial assets that are presented on the consolidated statement of financial position as well as loan commitments given and obtained. The line-by-line analysis does not directly reconcile with the consolidated statement of financial position.

	EURm	Total	Due within 3 months	Due between 3 and 12 months	Due between 1 and 3 years	Due between 3 and 5 years	Due beyond 5 years
2022							
Non-current financial assets							
Other non-current financial assets ⁽¹⁾		78	—	—	30	2	46
Non-current interest-bearing financial investments		767	5	7	376	275	104
Current financial assets							
Other current financial assets excluding derivatives ⁽¹⁾		284	207	77	—	—	—
Current interest-bearing financial investments		3 092	2 146	946	—	—	—
Cash and cash equivalents ⁽²⁾		5 509	4 947	31	136	200	195
Cash flows related to derivative financial assets gross settled:							
Derivative contracts – receipts		11 596	9 170	2 109	297	20	—
Derivative contracts – payments		(11 429)	(9 089)	(2 038)	(282)	(20)	—
Trade receivables		6 014	4 885	1 004	123	2	—
Non-current financial and lease liabilities							
Long-term interest-bearing liabilities		(5 348)	(43)	(98)	(2 182)	(1 397)	(1 628)
Long-term lease liabilities		(867)	—	—	(340)	(200)	(327)
Other non-current financial liabilities		(17)	—	—	(17)	—	—
Current financial and lease liabilities							
Short-term interest-bearing liabilities		(230)	(131)	(99)	—	—	—
Short-term lease liabilities		(223)	(61)	(162)	—	—	—
Other financial liabilities excluding derivatives ⁽³⁾		(502)	(482)	(20)	—	—	—
Cash flows related to derivative financial liabilities net settled:							
Derivative contracts – payments		(13)	5	(31)	(1)	7	7
Cash flows related to derivative financial liabilities gross settled:							
Derivative contracts – receipts		12 421	8 832	1 271	919	573	826
Derivative contracts – payments		(12 618)	(8 992)	(1 303)	(1 003)	(542)	(778)
Discounts without performance obligations		(539)	(205)	(211)	(121)	(2)	—
Trade payables		(4 730)	(4 561)	(165)	(3)	—	(1)
Commitments given and obtained							
Loan commitments given undrawn ⁽⁴⁾		(26)	(13)	(13)	—	—	—
Loan commitments obtained undrawn ⁽⁵⁾		1 486	(1)	(3)	80	1 410	—

(1) Other non-current financial assets and other current financial assets excluding derivatives include mainly customer financing related loan receivables.

(2) Instruments that include a call feature have been presented at their final maturities. Instruments that are contractually due beyond three months include EUR 551 million of instruments that have a call period of less than three months.

(3) Other financial liabilities include a conditional obligation to China Huaxin presented in the earliest period as the exercise period is open.

(4) Loan commitments given undrawn have been included in the earliest period in which they could be drawn or called.

(5) Loan commitments obtained undrawn have been included based on the period in which they expire. These amounts include related commitment fees.

EURm	Total	Due within 3 months	Due between 3 and 12 months	Due between 1 and 3 years	Due between 3 and 5 years	Due beyond 5 years
2021						
Non-current financial assets						
Other non-current financial assets ⁽¹⁾	236	15	13	110	86	12
Current financial assets						
Other current financial assets excluding derivatives ⁽¹⁾	128	110	18	–	–	–
Current interest-bearing financial investments	2 576	2 274	302	–	–	–
Cash and cash equivalents ⁽²⁾	6 695	6 268	71	126	230	–
Cash flows related to derivative financial assets net settled:						
Derivative contracts – receipts	2	–	(2)	4	–	–
Cash flows related to derivative financial assets gross settled:						
Derivative contracts – receipts	10 498	7 907	1 774	462	49	306
Derivative contracts – payments	(10 291)	(7 835)	(1 713)	(434)	(35)	(274)
Trade receivables	5 673	4 829	812	32	–	–
Non-current financial and lease liabilities						
Long-term interest-bearing liabilities	(5 409)	(39)	(86)	(1 171)	(2 038)	(2 075)
Long-term lease liabilities	(882)	–	–	(353)	(225)	(304)
Other non-current financial liabilities	(34)	–	–	(34)	–	–
Current financial and lease liabilities						
Short-term interest-bearing liabilities	(116)	(89)	(27)	–	–	–
Short-term lease liabilities	(236)	(62)	(174)	–	–	–
Other financial liabilities excluding derivatives ⁽³⁾	(522)	(504)	(18)	–	–	–
Cash flows related to derivative financial liabilities gross settled:						
Derivative contracts – receipts	12 100	8 483	1 629	1 179	180	629
Derivative contracts – payments	(12 220)	(8 556)	(1 663)	(1 231)	(176)	(594)
Discounts without performance obligations	(664)	(419)	(175)	(70)	–	–
Trade payables	(3 679)	(3 522)	(152)	(4)	–	(1)
Commitments given and obtained						
Loan commitments given undrawn ⁽⁴⁾	(21)	(3)	(18)	–	–	–
Loan commitments obtained undrawn ⁽⁵⁾	1 482	(1)	(3)	80	1 406	–

(1) Other non-current financial assets and other current financial assets excluding derivatives include mainly customer financing related loan receivables.

(2) Instruments that include a call feature have been presented at their final maturities. Instruments that are contractually due beyond three months include EUR 424 million of instruments that have a call period of less than three months.

(3) Other financial liabilities include a conditional obligation to China Huaxin presented in the earliest period as the exercise period is open.

(4) Loan commitments given undrawn have been included in the earliest period in which they could be drawn or called.

(5) Loan commitments obtained undrawn have been included based on the period in which they expire. These amounts include related commitment fees.

33. Subsequent events

Non-adjusting events after the reporting period

Offer to purchase outstanding notes

On 9 February 2023 Nokia announced that it commenced an offer to purchase the outstanding EUR 750 million 2.00% notes due 15 March 2024 (the “2024 Notes”), EUR 500 million 2.375% notes due 15 May 2025 (the “2025 Notes”) and EUR 750 million 2.00% notes due 11 March 2026 (the “2026 Notes”), up to a maximum cash consideration of EUR 700 million (the “Tender Offer”). The purpose of the Tender Offer is to manage the overall indebtedness of Nokia and to extend Nokia's debt maturity profile in an efficient manner.

On 16 February 2023 the Tender Offer expired. Nokia accepted tenders for EUR 372 million (49.66% of the nominal amount) of the 2024 Notes, EUR 208 million (41.57% of the nominal amount) of the 2025 Notes and EUR 120 million (15.96 % of the nominal amount) of the 2026 Notes. The Tender Offer was settled on 21 February 2023.

New euro-denominated notes

On 21 February 2023 Nokia issued EUR 500 million 4.375% sustainability-linked Notes due August 2031 under its 5 billion Euro Medium-Term Note Programme. The proceeds of the new notes are intended to fund the Tender Offer and for general corporate purposes.

Reports of independent registered public accounting firm

Report of independent registered public accounting firm

To the shareholders and the Board of Directors of Nokia Corporation.

Opinion on the Financial Statements

We have audited the accompanying consolidated statement of financial position of Nokia Corporation and subsidiaries (the "Company") as of December 31, 2022 and 2021, and the related consolidated income statement, consolidated statement of comprehensive income, consolidated statement of changes in shareholders' equity and consolidated statement of cash flows for each of the three years in the period ended December 31, 2022, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board and International Financial Reporting Standards as adopted by the European Union.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated 2 March 2023, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue recognition - Accounting for significant and complex contracts — Refer to Notes 2 and 6 to the financial statements

Critical Audit Matter Description

The Company recognises revenue in accordance with International Financial Reporting Standard 15 *Revenue from Contracts with Customers*. Certain contracts that the Company enters into are particularly significant in value and contain highly complex terms and conditions which impact revenue recognition. Such complexities include the determination of the standalone selling price, combination of contracts assessments, and accounting for contractual discounts and modifications.

Given the level of complexity and management judgement involved in the accounting for significant and complex contracts, performing audit procedures to evaluate the reasonableness of these accounting judgements required a high degree of auditor judgement, and there was significant audit effort in obtaining sufficient audit evidence.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the determination of the appropriateness of the accounting for significant and complex contracts included the following, among others:

- We assessed management's accounting policy in relation to the areas of complexity identified in all significant and complex contracts to determine compliance of the policy with IFRS 15;
- We tested the effectiveness of controls over revenue recognition of significant and complex contracts, specifically focusing on controls relating to the areas of accounting complexity;
- We utilised data analytics to identify those contracts with higher levels of risk based on size and complexity;
- We analyzed the terms and conditions of significant and complex contracts, and obtained and read the Company's accounting papers setting out management's accounting conclusions, along with other supporting audit evidence;

- We made inquiries of senior management in the finance and operations teams relevant to the significant and complex contracts regarding commercial and financial considerations relating to those contracts;
- We assessed whether management's conclusions, including determination of standalone selling price, were in compliance with IFRS 15.

Income taxes – Realisability of deferred tax assets in Finland — Refer to Notes 2 and 11 to the financial statements

Critical Audit Matter Description

The Company recognises deferred income taxes for tax attributes and for differences between the financial statement and tax basis of assets and liabilities in accordance with International Accounting Standards 12 Income Taxes. Deferred tax assets and liabilities are determined using the balance sheet liability method for all temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. Deferred tax assets are recognised to the extent it is probable that future taxable profit will be available against which the unused tax losses, unused tax credits and deductible temporary differences can be utilised. Deferred tax assets are assessed for realisability as of each reporting date.

As of December 31, 2022 the Company has determined that owing to underlying improvements in operating performance that are expected to be sustained in the longer term, there is sufficient evidence to recognize Finnish deferred tax assets of EUR 2.5 billion, resulting in an income tax benefit of EUR 2.5 billion.

The determination that it is probable that sufficient taxable profit will be generated in Finland in the future to realize deferred tax assets requires management to make significant judgments and estimates related to future taxable profit. Therefore, performing audit procedures to evaluate the reasonableness of management's estimates of future taxable profit and assessment that realization of the deferred tax assets is probable required a high degree of auditor judgment and an increased extent of effort, including the need to involve our income tax specialists.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to evaluating and challenging the Company's determination that it is probable that sufficient taxable profit will be generated in Finland in the future to realise deferred tax assets included the following, among others:

- We tested the effectiveness of controls over deferred tax assets, including management's controls over the estimates of future taxable profit in Finland;
- With the assistance of our income tax specialists, we evaluated whether the sources of management's estimated taxable income were of the appropriate character and sufficient to utilize the deferred tax assets under the relevant tax law;
- We evaluated whether the estimates of future taxable profit were consistent with evidence obtained in other areas of the audit;
- We evaluated the entity's recent history of profitability together with management's ability to accurately estimate taxable income;
- We tested the completeness and accuracy of the Finnish deferred tax balance to be recognized through tracing to supporting audit evidence; and
- We evaluated management's disclosures to determine whether they were in line with the requirements of IAS 12.

/s/ Deloitte Oy

Helsinki, Finland
2 March 2023

We have served as the Company's auditor since 2020.

Report of independent registered public accounting firm

To the shareholders and the Board of Directors of Nokia Corporation.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Nokia Corporation and subsidiaries (the "Company") as of 31 December 2022, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of 31 December 2022, based on criteria established in Internal Control — Integrated Framework (2013) issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended 31 December 2022, of the Company and our report dated 2 March 2023 expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's annual report on internal control over financial reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Deloitte Oy

Helsinki, Finland
2 March 2023

Other information

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Exhibits

1	<u>Articles of Association of Nokia Corporation (incorporated by reference to Exhibit 1 of our Annual Report on Form 20-F filed with the Securities and Exchange Commission on 23 March 2017 (File No. 1-13202)).</u>
8	Refer to Note 29, Principal Group companies, of our consolidated financial statements for more information on our significant subsidiaries.
11	<u>Code of Ethics.</u>
12.1	<u>Certification of Pekka Lundmark, President and Chief Executive Officer of Nokia Corporation, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
12.2	<u>Certification of Marco Wirén, Group Chief Financial Officer of Nokia Corporation, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
13	<u>Certification, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
15.1	<u>Consent of Deloitte Oy.</u>
101	Interactive Data Files (Inline XBRL – Related Documents).
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101).

Glossary

2G (Second Generation Mobile Communications): Also known as GSM (Global System for Mobile Communications): A digital system for mobile communications that is based on a widely-accepted standard and typically operates in the 900 MHz, 1800 MHz and 1900 MHz frequency bands.

3G (Third Generation Mobile Communications): The third generation of mobile communications standards designed for carrying both voice and data generally using WCDMA or close variants. See also WCDMA.

3GPP (The Third Generation Partnership Project): A consortium comprising several standards organizations which develop protocols for mobile telecommunications. The initial goal was to develop a global technical specification for a 3G mobile phone system. Since then, the operations have been extended and today the main focus is on 5G networks.

4G (Fourth Generation Mobile Communications): The fourth generation of mobile communications standards based on LTE, offering IP data connections only and providing true broadband internet access for mobile devices. See also LTE.

5G (Fifth Generation Mobile Communications): The next major phase of mobile telecommunications standards. 5G is a complete redesign of network architecture with the flexibility and agility to support upcoming service opportunities. It delivers higher speeds, higher capacity, extremely low latency and greater reliability.

6G (Sixth Generation Mobile Communications): The cellular industry introduces a new generation about every ten years. The next generation of technology is expected to be introduced by 2030 and is generally referred to as 6G.

Access network: A telecommunications network between a local exchange and the subscriber station.

Airframe: Our 5G-ready, end-to-end data center solution that combines the benefits of cloud computing technologies with the requirements of the core and radio telecommunications world. It is available in Rackmount and Open Compute Project (OCP) form factors. This enables the solution to be very scalable: from small distributed latency-optimized data centers to massive centralized hyperscale data center deployment.

AirScale Radio Access: A 5G-ready complete radio access generation that helps operators address the increasing demands of today and tomorrow. The solution comprises: Nokia AirScale Base Station with multiband radio frequency elements and system modules; Nokia AirScale Active Antennas; Cloud RAN with Nokia AirScale Cloud Base Station Server and the cloud-based AirScale RNC (Radio Network Controller) for 3G; Nokia AirScale Wi-Fi; common software; and services which use intelligent analytics and extreme automation to maximize the performance of hybrid networks.

Alcatel-Lucent: Alcatel-Lucent Group, that has been part of the Nokia Group since 2016.

Anyhaul: Mobile transport solution for 5G networks covering microwave, IP, optical and broadband.

Artificial Intelligence (AI): Autonomous and adaptive intelligence of machines, where machines have the ability to perform tasks in complex environments without constant guidance by a user and have the ability to improve performance by learning from experience.

Bandwidth: The width of a communication channel, which affects transmission speeds over that channel.

Base station: A network element in a mobile network responsible for radio transmission and reception to or from the mobile station.

Broadband: The delivery of higher bandwidth by using transmission channels capable of supporting data rates greater than the primary rate of 9.6 Kbps.

Churn: A measure of the number of customers or subscribers who leave their service provider, e.g., a mobile operator, during a given time period.

Cloud: Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort.

Cloud and Network Services: Our Cloud and Network Services business group enables CSPs and enterprises to deploy and monetize 5G, cloud-native software and as-a-Service delivery models.

CloudBand: Our cloud management and orchestration solutions enabling a unified cloud engine and platform for Network Functions Virtualization (NFV). See also NFV.

Cloud RAN: Cloud RAN refers to all or some of the baseband functions being run on a commercial off-the-shelf (COTS) computing platform rather than purpose-built hardware.

Common Software Foundation (CSF): As a coherent software suite, Nokia's cloud-native Common Software Foundation is designed to deliver applications that are hardware- and vendor-agnostic, and easy to deploy, integrate, use and upgrade.

Converged core: Wireless and fixed access convergence within the core. As we move towards a 5G standalone core, service providers will be able to use a common set of control plane functions within the core to manage both wireless and fixed user plane functions. The ability of a unified control plane will simplify operations and provide independent location, scaling and lifecycle management capabilities.

Convergence: The coming together of two or more disparate disciplines or technologies. Convergence types are, for example, IP convergence, fixed-mobile convergence and device convergence.

Core network: A combination of exchanges and the basic transmission equipment that together form the basis for network services.

CSPs: Communications service providers. One of Nokia's customer segments.

Customer Experience Management: Software suite used to manage and improve the customer experience, based on customer, device and network insights.

Digital: A signaling technique in which a signal is encoded into digits for transmission.

Discontinued operations: The continuing financial effects of the HERE business and the Devices & Services business. HERE was divested to an automotive consortium and substantially all of the Devices & Services business was sold to Microsoft.

Ecosystem: An industry term to describe the increasingly large communities of mutually beneficial partnerships that participants such as hardware manufacturers, software providers, developers, publishers, entertainment providers, advertisers and ecommerce specialists form in order to bring their offerings to market. At the heart of the major ecosystems in the mobile devices and related services industry is the operating system and the development platform upon which services are built.

Enterprise verticals: One of Nokia's customer segments. An enterprise vertical represents a grouping of companies by an industry (like energy or transportation) that offers products and services that meet specific needs of that industry. Within the enterprise verticals segments, we primarily focus on transportation, energy, manufacturing, logistics and the public sector.

ETSI (European Telecommunications Standards Institute): Standards produced by the ETSI contain technical specifications laying down the characteristics required for a telecommunications product.

Fixed Wireless Access (FWA): Uses wireless networks to connect fixed locations such as homes and businesses with broadband services.

FP5: Nokia's fifth generation of high-performance IP routing silicon, and the latest range of our AirScale 5G products.

Future X: A network architecture - a massively distributed, cognitive, continuously adaptive, learning and optimizing network connecting humans, senses, things, systems, infrastructure and processes.

G.fast: A fixed broadband technology able to deliver up to 1Gbps over very short distances (for example, for in-building use, also called "Fiber-to-the-Building"). Launched in 2014, G.fast uses more frequencies and G.fast Vectoring techniques to achieve higher speeds.

GPON (Gigabit Passive Optical Network): A fiber access technology that delivers 25Gbps over a single optical fiber to multiple end points including residential and enterprise sites.

GSM (Global System for Mobile Communications): A digital system for mobile communications that is based on a widely accepted standard and typically operates in the 900 MHz, 1800 MHz and 1900 MHz frequency bands. See also 2G.

GSM-R (GSM-Railway): An international wireless communications standard for railway communication and applications. A sub-system of European Rail Traffic Management System (ERTMS), it is used for communication between train and railway regulation control centers.

Hexa-X: European Commission's flagship 6G initiative for research into the next generation of wireless networks. The initiative began in January 2021 with Nokia as project lead, working closely with a strong consortium of European partners.

Hyperscalers: One of Nokia's customer segments. Hyperscaler refers to companies like Alphabet (Google), Amazon (Amazon Web Services), Microsoft and Meta Platforms (Facebook) that provide cloud solutions at a global scale leveraging massive connected data centers.

Internet of Things (IoT): All things such as cars, the clothes we wear, household appliances and machines in factories connected to the internet and able to automatically learn and organize themselves.

IP (Internet Protocol): A network layer protocol that offers a connectionless internet work service and forms part of the (Transmission Control Protocol) TCP/IP protocol.

IP (Intellectual Property): Intellectual property results from original creative thought, covering items such as patents, copyright material and trademarks, as well as business models and plans.

IPR (Intellectual Property Rights): Legal rights protecting the economic exploitation of intellectual property, a generic term used to describe products of human intellect, for example patents, that have an economic value.

IP/MPLS (IP Multiprotocol Label Switching): IP/MPLS is a routing technique in telecommunications networks that directs data from one node to the next based on short path labels rather than long network addresses, thus avoiding complex lookups in a routing table and speeding traffic flows.

IPR licensing: Generally, an agreement or an arrangement where a company allows another company to use its intellectual property (such as patents, trademarks or copyrights) under certain terms.

LTE (Long-Term Evolution): 3GPP radio technology evolution architecture and a standard for wireless communication of high-speed data. Also referred to as 4G.

Mission-critical networks/communications: One of the key elements of 5G. Mission-critical communications meets the needs of emergency responders such as emergency operations centers, fire departments, emergency vehicles, police, and search and rescue services, replacing traditional radio with new communications capabilities available to smartphone users.

Mobile broadband: Refers to high-speed wireless internet connections and services designed to be used from multiple locations.

Mobile Networks: Our Mobile Networks business group offers products and services for radio access networks covering technologies from 2G to 5G, and microwave radio links for transport networks.

MPLS: Multiprotocol Label Switching, a routing technique for networks.

MSO: Multiple System Operators (MSO) are operators of multiple cable television systems. The majority of system operators run cable systems in more than one community and hence most of them are multiple system operators.

Network Infrastructure: Our Network Infrastructure business group provides fiber, copper, fixed wireless access technologies, IP routing, data center, subsea and terrestrial optical networks – along with related services – to customers including communications service providers, webscales (including hyperscalers), digital industries and governments.

NFV (Network Functions Virtualization): Principle of separating network functions from the hardware they run on by using virtual hardware abstraction.

Nokia Bell Labs: Our research arm engaged in discovering and developing the technological shifts needed for the next phase of human existence as well as exploring and solving complex problems to radically redefine networks.

Nokia Technologies: Our Nokia Technologies business group is responsible for managing Nokia's patent portfolio and monetizing Nokia's intellectual property, including patents, technologies and the Nokia brand.

Non-Standalone (NSA): Network architecture that is built over an existing 4G network.

Operating System (OS): Software that controls the basic operation of a computer or a mobile device, such as managing the processor and memory. The term is also often used to refer more generally to the software within a device, for example, the user interface.

O-RAN: The term O-RAN refers to interfaces and architecture elements as specified by the O-RAN alliance. O-RAN Alliance is a specification group defining next-generation RAN infrastructures, empowered by principles of intelligence and openness.

Packet: Part of a message transmitted over a packet-switched network.

Platform: Software platform is a term used to refer to an operating system or programming environment, or a combination of the two.

PON (Passive Optical Network): A fiber access architecture in which unpowered fiber optic splitters are used to enable a single optical fiber to serve multiple endpoints without having to provide individual fibers between the hub and customer.

Private wireless network: Private wireless is a standalone network focused on industrial operational assets and users. A private wireless network provides broadband connectivity, similar to a public wireless network, but is owned and controlled by the organization that built or purchased it.

Programmable world: A world where connectivity will expand massively, linking people as well as billions of physical objects – from cars, home appliances and smartphones, to wearables, industrial equipment and health monitors. What distinguishes the Programmable World from the Internet of Things (IoT) is the intelligence that is added to data to allow people to interpret and use it, rather than just capture it.

PSE-3: The PSE-3 chipset is the first coherent digital signal processor to implement Probabilistic Constellation Shaping (PCS), a modulation technique pioneered by Nokia Bell Labs.

RAN (Radio Access Network): A mobile telecommunications system consisting of radio base stations and transmission equipment.

SDAN: Software Defined Access Network.

SDN (Software-Defined Network): Decoupling of network control and data forwarding to simplify and automate connections in data centers, clouds and across the wide area.

SD-WAN: Software-Defined Networking in a Wide Area Network (WAN) that simplifies and automates enterprise networks, seamlessly connecting users and applications, from branch office to cloud.

SEP (Standard-Essential Patent): Generally, patents needed to produce products which work on a standard which companies declare as essential and agree to license on Fair, Reasonable and Non-Discriminatory (FRAND) terms. Can also be referred to as essential patent.

Single RAN: Single RAN (S-RAN) allows different radio technologies to be provided at the same time from a single base station, using a multi-purpose platform.

Small cells: Low-powered radio access nodes (micro cells or picocells) that are a vital element in handling very dense data traffic demands. 3G and LTE small cells use spectrum licensed by the operator; Wi-Fi uses unlicensed spectrum which is therefore not under the operator's exclusive control.

Standalone (SA): Network architecture that allows independent operation of a 5G service without interaction with an existing 4G core and 4G radio network.

Technology licensing: Generally, refers to an agreement or arrangement where under certain terms a company provides another company with its technology and possibly know-how, whether protected by intellectual property or not, for use in products or services offered by the other company.

Telco cloud: Applying cloud computing, SDN and NFV principles in telecommunications environment, for example separating application software from underlying hardware with automated, programmable interfaces while still retaining telecommunications requirements such as high availability and low latency.

Transmission: The action of conveying signals from one point to one or more other points.

TXLE (Technical Extra-Large Enterprise): Technically sophisticated companies, such as banks, that invest heavily in their own network infrastructures to gain a key competitive advantage.

VDSL2 (Very High Bit Rate Digital Subscriber Line 2): A fixed broadband technology, the successor of ADSL. Launched in 2007, it typically delivers a 30Mbps broadband service from a street cabinet (also called a Fiber to the Node deployment) over existing telephone lines.

VDSL2 vectoring: A fixed broadband technology launched in 2011, able to deliver up to 100Mbps over a VDSL2 line by applying noise cancellation techniques to remove cross-talk between neighboring VDSL2 lines.

Virtual Reality (VR): The simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.

VoLTE (Voice over LTE): Required to offer voice services on an all-IP LTE network and generally provided using IP Multimedia Subsystem, which is an architectural framework designed to deliver IP-based multimedia services on telecommunications networks; standardized by 3GPP.

WAN (Wide Area Network): A geographically distributed private telecommunications network that interconnects multiple local area networks.

WCDMA (Wideband Code Division Multiple Access): A third-generation mobile wireless technology that offers high data speeds to mobile and portable wireless devices. Also referred to as 3G.

Webscale companies: Companies which are investing in cloud technology and network infrastructure on an increasing scale to fulfill their needs for massive, mission-critical networks.

WING: Worldwide IoT Network Grid is a managed service that offers CSPs the ability to support their enterprise customers with global IoT connectivity across borders and technologies.

WLAN (Wireless Local Area Network): A local area network using wireless connections, such as radio, microwave or infrared links, in place of physical cables.

Investor information

Information on the internet

www.nokia.com

Available on the internet: financial reports, members of the Group Leadership Team, other investor-related materials and events, and press releases as well as environmental and social information, including our People & Planet Report, Code of Conduct, Corporate Governance Statement and Remuneration Statement.

SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC (<http://www.sec.gov>).

Investor Relations contacts

investor.relations@nokia.com

Annual General Meeting

Date: 4 April 2023

Place: Helsinki, Finland

Dividend

The Board proposes to the Annual General Meeting 2023 to be authorized to decide, in its discretion, on the distribution of an aggregate maximum of EUR 0.12 per share as dividend from the retained earnings and/or as assets from the reserve for invested unrestricted equity.

Financial reporting

Our interim reports in 2023 are planned to be published on 20 April 2023, 20 July 2023 and 19 October 2023. The full-year 2023 results are planned to be published in January 2024.

Information published in 2022

All our global press releases and statements published in 2022 are available on the internet at www.nokia.com/en_int/news/releases.

Stock exchanges

The Nokia Corporation share is quoted on the following stock exchanges:

	Symbol	Trading currency
Nasdaq Helsinki (since 1915)	NOKIA	EUR
New York Stock Exchange (since 1994)	NOK	USD
Euronext Paris (since 2015)	NOKIA	EUR

Documents on display

The documents referred to in this Annual Report on Form 20-F can be read at the Securities and Exchange Commission's internet site at <http://www.sec.gov>.

Contact information

Nokia Head Office

Karakaari 7

FI-02610 Espoo, Finland
FINLAND

Tel. +358 (0) 10 44 88 000
Fax +358 (0) 10 44 81 002

Signatures

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this Annual Report on Form 20-F on its behalf.

Nokia Corporation

By: **/S/ STEPHAN PROSI**
Name: Stephan Prosi
Title: Vice President, Corporate Controlling and Accounting

By: **/S/ ESA NIINIMÄKI**
Name: Esa Niinimäki
Title: Chief Legal Officer

2 March 2023



CODE OF ETHICS

FOR THE PRINCIPAL EXECUTIVE OFFICERS AND THE SENIOR FINANCIAL OFFICERS

1 Purpose

The purpose of this Code of Ethics (the “Code”) is to reinforce ethical behavior and promote high standards of corporate governance. This Code complements Nokia’s Code of Conduct, Nokia Insider Policy and other guidelines and policies applicable at Nokia.

2 Applicability

The Code applies to Nokia’s President and Chief Executive Officer, Chief Financial Officer, Deputy Chief Financial Officer and Corporate Controller (the “Officers”).

3 Good corporate practices

3.1 Honest and ethical conduct

The Officers shall act honestly and ethically in all their business activities in their respective roles. They shall comply with and promote compliance with the highest standards of ethical conduct, including the principles set out in Nokia’s Code of Conduct, in all their business activities at Nokia.

3.2 Conflicts of interest

Situations involving an actual or apparent conflict of interest between personal and professional relationships of the Officers with Nokia, or any doubt thereof, shall be handled in an ethical way. An Officer shall not participate in consideration of a matter in which he/she has a conflict of interest or even a perceived conflict of interest between his/her personal and professional relationships with respect to Nokia.

For the avoidance of doubt, the Officers shall comply with the provisions on conflicts of interest included in various Nokia guidelines and policies (e.g., Nokia Insider Policy, Conflict of Interest Policy and external board membership related standard operating procedures).

3.3 Fair and timely disclosure

The Officers shall take all measures generally required from a prudent principal executive officer or senior financial officer, including measures in accordance with Nokia's disclosure controls and procedures, to promote full, fair, accurate, timely and understandable disclosure in reports and documents filed with or submitted to financial and regulatory authorities or stock exchanges by Nokia.

3.4 Compliance with laws and regulations

The Officers shall comply in all their business activities in their respective roles with all applicable governmental laws, rules and regulations of Finland and other applicable jurisdictions, as well as the rules of stock exchanges on which Nokia shares are listed, including the New York Stock Exchange. These obligations include cooperating, appropriately, with governmental investigations of Nokia's business and operations.

4 Accountability

4.1 Clearances

Nokia regards adherence to this Code as well as accountability for such adherence as important.

The Chief Compliance Officer may, upon request, advise the Officers whether a particular situation or behavior is in compliance with this Code or not, and give a clearance for a situation or behavior that is obviously and evidently compliant. The determination whether a conflict of interest exists or not, shall be made by the Chief Compliance Officer or, upon the request of the Officer or the Chief Compliance Officer, by the Chair of the Audit Committee.

4.2 Reporting of illegal or unethical behavior

Any suspected failures to adhere to, and suspected violations of this Code by any of the Officers, shall be reported to the Chief Compliance Officer or to the Chair of the Audit Committee. Except for such matters that are beyond question frivolous, each such matter shall be reviewed and considered by the Audit Committee. The matter shall be prepared for such consideration by the Chief Compliance Officer or another officer as instructed by the Audit Committee.

4.3 Violations

The Audit Committee shall consider and determine if a violation of this Code has occurred, and possible consequences, if any, for such violation. The consequences may vary from a

written reprimand to a recommendation to the corporate body entitled to discharge the Officer in question to discharge him/her from his/her duties, and may include other measures that the Audit Committee deems appropriate, depending on the circumstances of the case.

4.4 Recording

The Chief Compliance Officer shall keep records of all clearances given by him/her or the Vice Chair of the Board, as well as of all reports made under this Code on suspected failures by the Officers to adhere to the Code or suspected violations thereof. In addition, records shall be kept on all decisions taken by the Audit Committee in respect of matters considered under this Code.

5 Assignments

The Audit Committee may authorize its Chair to resolve a specific matter, or a specific category of matters, under this Code.

Any reference to the Chief Compliance Officer in this Code is equally applicable to his/her deputy.

6 Waivers

Any waiver of this Code may be made only by the Audit Committee and must be disclosed as set forth below.

7 Disclosure

This Code will be published on the Nokia's website. Amendments to, and waivers of, this Code will be disclosed in a similar way.

8 Approval and amendments

This Code is approved, and may be amended, by the Board of Directors of Nokia.

CERTIFICATION

I, PEKKA LUNDMARK, certify that:

1. I have reviewed this Annual Report on Form 20-F of Nokia Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Date: 2 March 2023

/s/ PEKKA LUNDMARK

PEKKA LUNDMARK

President and Chief Executive Officer

CERTIFICATION

I, MARCO WIRÉN, certify that:

1. I have reviewed this Annual Report on Form 20-F of Nokia Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Date: 2 March 2023

/s/ **MARCO WIRÉN**

MARCO WIRÉN

Chief Financial Officer

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report on Form 20-F of Nokia Corporation (the “Company”) for the period ended December 31, 2022, as filed with the Securities and Exchange Commission on the date hereof (the “Report”), pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, the undersigned hereby certify that, to the best of our knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: 2 March 2023

/s/ PEKKA LUNDMARK

Name: PEKKA LUNDMARK

Title: President and Chief Executive Officer

/s/ MARCO WIRÉN

Name: MARCO WIRÉN

Title: Chief Financial Officer

* The foregoing certification is being furnished solely pursuant to 18 U.S.C. Section 1350 and is not being filed as part of the Report or as a separate disclosure document.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-253253, 333-236903, 333-230467, and 333-223848 on Form S-8 of our reports dated 2 March 2023 relating to the financial statements of Nokia Corporation and the effectiveness of Nokia Corporation's internal control over financial reporting appearing in this Annual Report on Form 20-F for the year ended 31 December 2022.

/s/ Deloitte Oy

Deloitte Oy
Helsinki, Finland
2 March 2023
