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Going Digital: Shaping Norway's Digital Future

This report assesses Norway's digital performance and maps its digital policy landscape and priorities with a view to informing the design of Norway's forthcoming national digital strategy. It was prepared with the support of Norway's Ministry of Digitalisation and Public Governance as well with stakeholders from academia and the private sector, including Digital Norway and Innovation Norway. It complements a companion paper on orientations for Norway's forthcoming digital government strategy that is being prepared by the GOV/INDIGO division.

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DPC delegates are invited to approve and declassify the report.

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Going Digital: Shaping Norway's digital future

As the pace of technological change accelerates, reaching the digital frontier – and staying there – is increasingly challenging. This report analyses Norway's digital performance, policies and priorities with a view to informing the development of a new national digital strategy that seeks to sharpen Norway's competitive edge and ensure that digital transformation benefits all Norwegians. It outlines the digital priorities and trends that will shape Norway's digital future and maps Norway's digital policy ecosystem. This report further assesses Norway's digital performance based on the OECD Going Digital Toolkit dashboard of indicators and analyses Norway's digital policies using the analytical lens of the OECD Going Digital Integrated Policy Framework. It concludes with a set of policy recommendations aimed at achieving a more digital, innovative and inclusive Norway.

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Abbreviations

This publication uses ISO codes for countries or economies.

AUS	Australia	IRL	Ireland
AUT	Austria	ISL	Iceland
BEL	Belgium	ISR	Israel
BRA	Brazil	ITA	Italy
CAN	Canada	JPN	Japan
CHE	Switzerland	KOR	Korea
CHL	Chile	LTU	Lithuania
CHN	People's Republic of China	LUX	Luxembourg
COL	Colombia	LVA	Latvia
CRI	Costa Rica	MEX	Mexico
CZE	Czech Republic	NLD	Netherlands
DEU	Germany	NOR	Norway
DNK	Denmark	NZL	New Zealand
EGY	Egypt	POL	Poland
ESP	Spain	PRT	Portugal
EST	Estonia	ROU	Romania
FIN	Finland	SVK	Slovak Republic
FRA	France	SVN	Slovenia
GBR	United Kingdom	SWE	Sweden
GRC	Greece	THA	Thailand
HRV	Croatia	TUR	Republic of Türkiye
HUN	Hungary	USA	United States
IDN	Indonesia	ZAF	South Africa
IND	India		

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Executive summary

1. Norway is at the digital frontier in many areas. The challenge for Norway is how to keep pace with rapid technological developments and competition, while improving performance in areas in which there are opportunities to catch up. Staying at the frontier requires agility, flexibility and well-co-ordinated digital policies. A national digital strategy (NDS) can play an important role in ensuring that the right policy framework is in place to make to most of digital technologies and data for growth and well-being.

2. Norway has identified several underlying priorities that will shape the content and structure of its forthcoming NDS: ensuring high-quality information and communications infrastructure; developing the data economy; fostering data protection and information security; increasing the digitalisation of small and medium-sized enterprises (SMEs); promoting an inclusive digital society in the context of an ageing population; supporting the green transition; and digitalising the public sector. These priorities will help to realise Norway's vision of a sustainable welfare society that safeguards a safe and simple everyday life for citizens and the non-government sector, a strengthened business sector and a renewed public sector.

3. Norway's digital policy landscape includes relatively more initiatives related to Innovation than the other dimensions of the OECD Going Digital Integrated Policy Framework (the Framework), followed by Society, Access and Use. In terms of performance, Norway outperforms all OECD countries in indicators related to the effective use of digital technologies, and it outperforms the OECD and Nordic averages in societal indicators of digital transformation. Norway is above the OECD average on indicators of Trust and Access, although below the Nordic average. Norway has opportunities to catch up in indicators related to Market Openness, Jobs and digital Innovation where there is the most potential to improve performance.

4. Key policy recommendations to achieve a more digital, innovative and inclusive Norway are structured around six areas in which Norway may wish to focus as it designs its next NDS.

- **Encourage technology adoption and skills development to ensure a more digital-intensive economy and resilient workforce.** This involves promoting the adoption of digital technologies among SMEs and empowering people with the skills to succeed in a digital world of work.
- **Prioritise innovation to create a more digital Norway**. This encompasses encouraging a culture of experimentation and risk-taking, reducing regulatory burdens on start-ups and young firms, incentivising venture capital investment and support firms in scaling up, promoting investment in R&D, and harnessing the potential of "GovTech".
- **Maximise data's potential while maintaining Norway's strong culture of trust.** This includes leveraging Norway's culture of trust to incentivise data sharing, realising open government data's potential to drive digital innovation, taking a multifaceted approach to monitoring and addressing cyber risks, and supporting the development of data-related skills and infrastructure.
- **Harness the potential of digital technologies for society.** This involves increasing digital inclusion through policies targeted at the groups most in need, discouraging e-waste production, and encouraging e-waste recycling.
- **Prepare for next generation networks and a future of unlimited connectivity everywhere.** This entails upgrading fixed and mobile networks to 5G and beyond, closing geographic connectivity divides by focusing on the underserved, fostering competition and reducing red tape, and supporting businesses improve their connectivity.

- **Design holistic digital policies within effective governance and monitoring mechanisms.** This involves using all dimensions of the Framework to design future digital policies, fostering inter-ministerial and stakeholder co-operation in digital policy design and implementation, monitoring progress using the Going Digital Toolkit as Norway's national digital dashboard, and strengthening a whole-of-government approach to the adoption of digital technologies in the public sector.

Introduction

5. Norway's digital future is intertwined with broader technological and global trends. Rapid changes have characterised the most recent phase of digital transformation with several key technological breakthroughs, including data-dependent technologies like big data analytics and artificial intelligence (AI). Generative AI in particular is reshaping the technology landscape, bringing productivity enhancements and convenience, but also risks. Other key technologies include Internet of Things (IoT) technologies, cloud computing, next generation wireless networks (e.g., 5G and beyond), distributed ledger technologies (e.g., blockchain), immersive technologies and quantum computing.

6. Alone, each of these technologies is powerful, bringing opportunities to improve efficiency and generate consumer welfare. However, immense potential lies in their combination within an integrated digital technology ecosystem. For example, the extensive use of connected devices and sensors, including in the context of smart cities, generates enormous amounts of data that can enable AI to generate new insights and efficiencies. Keeping pace with these developments means that even if a country is at the technological frontier, staying there requires continuous investment and attention.

7. Digital technologies and large-scale data flows fundamentally change how people live and work, interact with one another, participate in the economy, and engage with the government. Yet such benefits come with new challenges as digital transformation changes the nature and structure of organisations, markets and communities, and raises concerns around jobs and skills, privacy and security, as well as notions of equity and inclusion. Societal effects of digital transformation are complex because overall impacts are often not clear-cut. People, firms and governments need to work together to shape a digital future that makes the most of the immense opportunities that digital transformation holds to improve people's lives, while ensuring that no one is left behind.

8. The Nordic region has been a digital front-runner for many years, and Norway is at the frontier in many areas. The challenge for Norway is how to keep pace with rapid technological developments and competition from its neighbours and beyond, while improving performance in areas in which there is opportunity to catch up. Staying at the frontier requires agility, flexibility, and well-co-ordinated digital policies. In this respect, a national digital strategy (NDS) can play an important role in ensuring that the right policy framework is in place to make to most of digital technologies and data for growth and well-being.

9. As Norway develops a new national digital strategy, it is useful to take stock of Norway's digital performance, priorities and policy landscape. Using the analytical lens of the OECD Going Digital Integrated Policy Framework (the Framework) (OECD, 2020[1]) as a guide, this report reviews key developments in Norway's digital performance and policies with a view to providing input into the design of a new national digital strategy for Norway. It includes four sections: digital priorities and trends that will shape Norway's digital future; mapping Norway's digital policy ecosystem; situating Norway's digital performance and outlook in its policy context; and policy recommendations aimed at making Norway more digital, innovative and inclusive.

Section 1. Digital priorities and trends that will shape Norway's digital future

10. Digital transformation touches all aspects of the economy and society. While ensuring a holistic approach is important, it is also essential for policy makers to focus on a few key priorities. These priorities sometimes aim to address weaknesses; other times, they represent key social objectives, and even if performance in these areas is strong, there is a desire to stay ahead. Norway has identified several priorities that will shape the content and structure of its forthcoming NDS: ensuring high-quality information and communications infrastructure; developing the data economy; fostering data protection and information security; increasing the digitalisation of small and medium-sized enterprises (SMEs); promoting an inclusive digital society in the context of an ageing population; supporting the green transition; and digitalising the public sector. These priorities will help to realise the Norwegian Government's vision of a sustainable welfare society that safeguards a safe and simple everyday life for citizens and the non-governmental sector, a strengthened business sector and a better and renewed public sector.

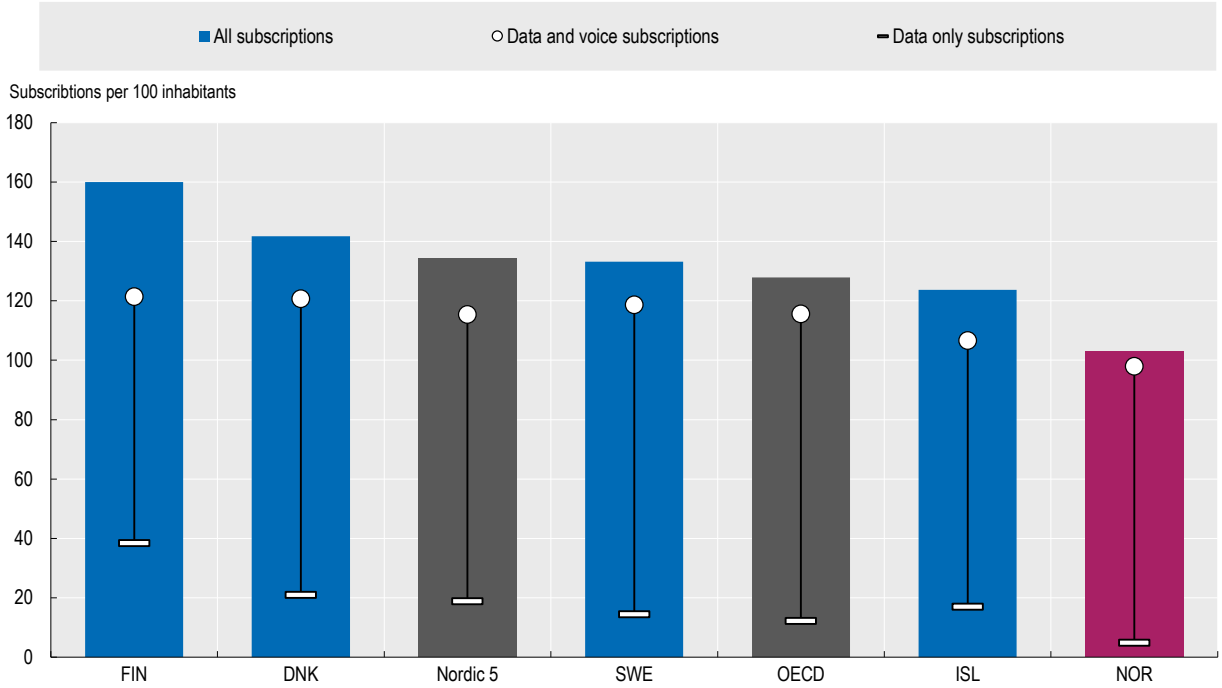
Ensuring high-quality information and communications infrastructure

11. Access to high quality connectivity is a foundation for digital transformation. Firms and governments worldwide are investing to expand and upgrade existing networks to ensure they remain ready for the data demands of tomorrow. Norway performs well compared to other OECD countries when it comes to connectivity. More households in Norway (99%) have broadband connectivity than in the average OECD country (92%) (OECD, 2023[2]), and Norway has the second lowest level of disparity between rural and urban broadband provision of any OECD country (OECD, 2023[3]). Moreover, Norway has a higher than OECD average share of businesses with broadband connections over 100Mbps (OECD, 2024[4]) and 99.9% of its population is covered by a 4G network (OECD, 2024[5])

12. Despite its good performance, an area in which Norway has an opportunity to catch up is in mobile broadband uptake (Figure 1), which is key to the development of next generation networks that offer the prospect of unlimited connectivity everywhere and the realisation of the full potential of the IoT (OECD, forthcoming[6]). Norway's uptake in mobile broadband is below the OECD and Nordic averages, and it is more pronounced in data-only subscriptions which are particularly useful for IoT applications. Indeed, Norway has 1 data-only subscription per 100 inhabitants, compared to 12 for the OECD average and 14 for Sweden (OECD, 2023[7]). This could be partly explained by a propensity towards fixed connections; however, fibre penetration is high across all Nordic countries.

Figure 1. Mobile broadband uptake, 2022

Subscriptions per 100 inhabitants



Note: See endnotes.[1]
Source: The OECD Going Digital Toolkit, based on the OECD Broadband Portal (http://www.oecd.org/sti/broadband/broadband-statistics), https://goingdigital.oecd.org/indicator/11 (accessed on 16 February 2024).

13. Norway's commitment to action in this area is no surprise given the rapid growth in data consumption, the existence of older communications technologies such as fibre-to-the-cabinet (FTTC), and the need to upgrade 4G networks to fibre-to-the-home (FTTH) and roll-out 5G to meet the connectivity needs of the future. However, upgrading existing networks in Norway represents a sizeable engineering challenge, with large amounts of new hardware required and the return on investment far from guaranteed outside of highly populated areas. Moreover, an increasing reliance on digital technologies and services delivered over the Internet for everyday life for everything from banking to shopping to healthcare means the consequences of connectivity outages are increasing, particularly for rural communities. Ensuring that modern connectivity networks are robust and resilient requires upgrades to the power network, alongside suitable contingency measures in the event of long outages caused by severe weather events, which are only likely to become more common as the global climate continues to change.

Developing the data economy

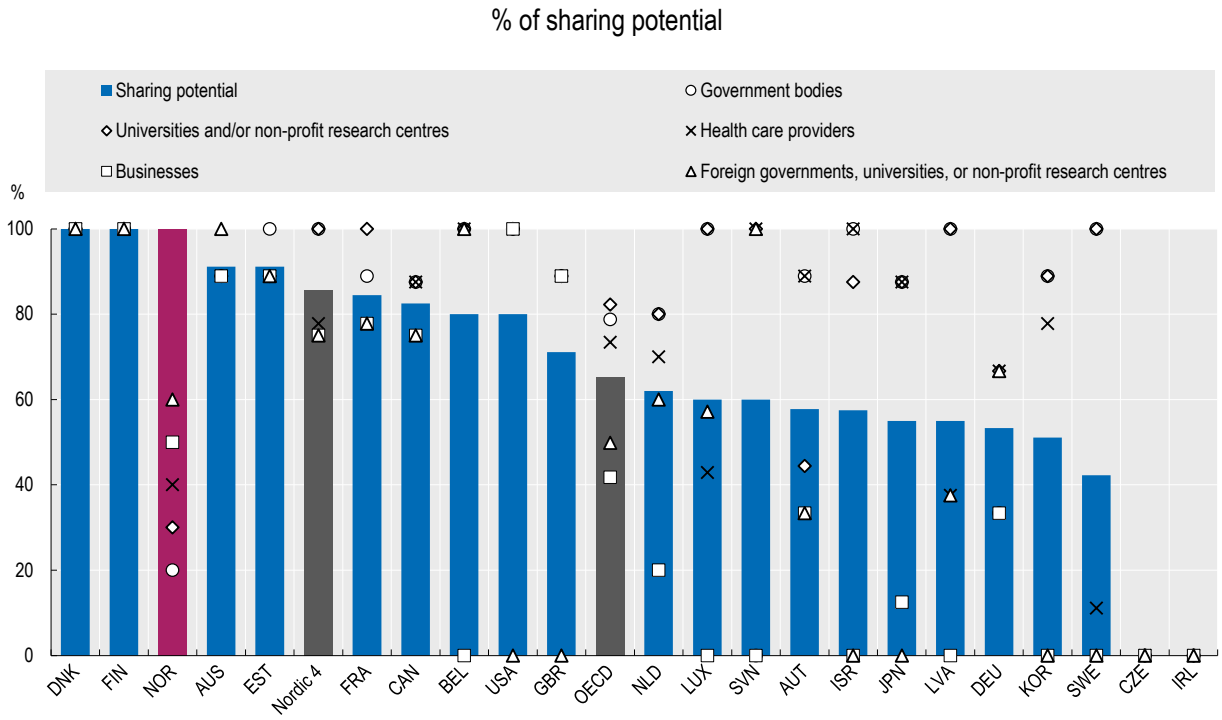
14. Digital technologies have increasingly made generating, storing, manipulating and managing data easier than ever before, making data an integral part of daily life. Devices, services and sensors that are ever more ubiquitous facilitate both the generation and use of increasingly large streams of data. Algorithms create value from data, and data in turn improves the output from algorithms, leading to advances in machine learning and new forms of AI. A lot of data are created and used by consumers and exchanged over the Internet. As the IoT progresses, connected devices will become even more central for

data collection and consumption. However, not all data are the same, and different types of data may require different treatment from a policy perspective (OECD, 2019[8]).

15. From an economic perspective, data underpin digital transformation and have become an important source of value, including for decision-making and production, for firms, governments, people and society. The availability and prevalence of data has given rise to new or significantly improved products, services and business models, and has contributed to enhancing productivity (Mitchell, Ker and Lesher, 2021[9]). Data are also helping to address societal challenges, ranging from climate change to the management of natural disasters to health crises.

16. Norway has been active in trying to develop the data economy, and the healthcare sector serves as an example of the nation's capacity to harness the benefits of data sharing. Norway excels in sharing national health datasets with both domestic and international stakeholders. In 2020, the intensity of health data sharing was 100%, showing that actors in Norway are allowed to share all national health datasets with all relevant stakeholders (Figure 2). The high data-sharing intensity in the healthcare system may be in part credited to the eNorway plan, an initiative that facilitated secure communication between patients and healthcare professionals.

Figure 2. Health data sharing intensity, 2020



Note: See endnotes.[2]
Source: The OECD Going Digital Toolkit, based on the OECD Questionnaire on Health Data Development and Governance, https://goingdigital.oecd.org/indicator/64 (accessed on 12 February 2024).

17. While good progress has been made on data sharing in sectors such as health and banking in Norway, there remains untapped potential in other areas. This is particularly the case in the private sector, where the immediate business incentives of opening up and sharing data are not always clear, but where the positive societal externalities can be greatest. For example, the extraction industries (e.g. oil and gas) and agriculture could benefit from improved access to and sharing of data between companies, through

increased efficiencies resulting in lower production costs, although this can be challenging in a competitive environment. Likewise, the construction and building sector has significant scope to increase the level of shared environmental data, which could bring significant benefits in the area of energy optimisation.

Fostering data protection and information security

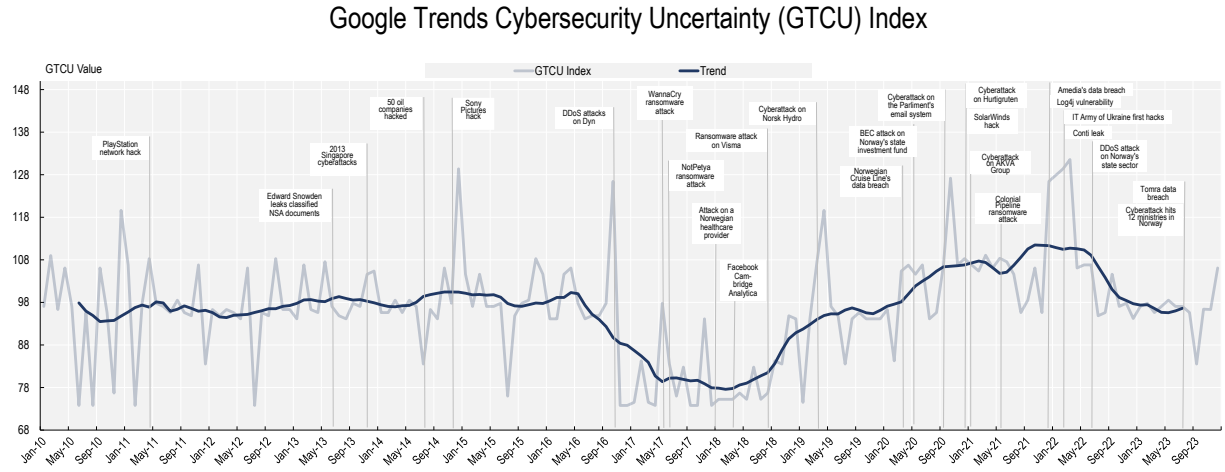
18. As the digital technology ecosystem becomes increasingly interdependent and complex, the risk of privacy breaches and systemic failures spreading rapidly and unpredictably across sectors and borders has increased. To fully embrace and benefit from digital transformation, individuals, firms, and governments need to be confident that engaging in digital environments will bring more benefits than downsides. Such downsides can arise from various sources of uncertainties, data, and cross-border flows. Many are related to potential cybersecurity incidents (e.g. breaches of availability, integrity or confidentiality of data, systems or networks). Other downsides are related to breaches of laws and regulations such as privacy, consumer protection or product safety.

19. It is vital that actors in the digital ecosystem feel their data is both secure and protected. While Norway's data privacy laws are in line with European Union (EU) countries, creating a culture and understanding of data protection and information security involves going beyond legislation. Government action can help to build the capacity of people and firms to protect themselves in digital environments, and in turn better data stewardship can lead to increased levels of data sharing and the positive impacts this brings for innovation and productivity.

20. Ensuring cybersecurity and resilience of critical infrastructure and services are fundamental for digital transformation to flourish in Norway and beyond. Cybersecurity uncertainty is a multifaceted phenomenon that arises from the inherent unpredictability and ambiguity surrounding cyber threats and vulnerabilities. It manifests itself in the limited transparency regarding emerging threats, the challenges of assessing known vulnerabilities, and the daunting task of predicting the impact of future cyberattacks. This inherent uncertainty can significantly impact cybersecurity strategies, decision-making, and public perceptions of cyber risks.

21. Figure 3 presents a cybersecurity uncertainty index based on online search data for Norway for the period January 2010 to December 2023. Norway's index reveals peaks aligned with significant national and global cyber incidents. Instances such as the DdoS attack on Dyn in October 2016; the WannaCry ransomware attack in May 2017; the cyberattacks on Norsk Hydro (March 2019) and Norway's parliament email system (October 2020); and Amedia's data breach (December 2021) indicate that the cybersecurity uncertainty index serves as a reliable proxy for assessing cyber risk uncertainty in Norway.

Figure 3. Cybersecurity uncertainty in Norway, 2010-2023



Note: This figure chart presents a cybersecurity uncertainty index for Norway from January 2010 to December 2023 based on online search data. See endnotes.[3]
Source: Authors' elaboration based on (Lange, Lesher and Benoit, forthcoming[10]).

22. Variations in the GTCU index between countries can be attributed to a range of factors, including differences in awareness about cyber risks, investment, or exposure to cybercrime. The periods of stability, on the other hand, might indicate a relative lull in cyber incident activity or successful mitigation efforts. Overall, a comprehensive understanding of these fluctuations provides insights into the multifaceted nature of uncertainty surrounding cyber incidents in Norway, contributing to informed policymaking and strategic planning in cyber risk management.

Increasing the digitalisation of SMEs

23. SMEs and young firms create a disproportionate number of jobs relative to their size, and they underpin economic growth. Digital tools can help SMEs develop more efficient business processes and diverse product lines, as well as scale up and internationalise. But smaller, younger firms may face barriers to adopting new business models, investing in key technologies or developing the skills to use them. SMEs play a crucial role in Norway's economy, contributing to nearly half of employment (OECD, 2023[11]) and serving as catalysts for innovation. In 2023, 64% of Norwegian SMEs had access to fixed broadband download speeds of at least 100Mbit/s, above the EU average (62%) but below Denmark (86%), Finland (76%) and Sweden (77%) (OECD, 2024[4]). Obstacles persist for smaller and younger Norwegian companies in integrating into digital markets, accessing capital and acquiring ICT skills.

24. The shortage of risk capital is another common barrier for Norwegian SMEs to scale up and spread their productivity benefits. Venture capital (VC) firms and investors are key mechanisms for firms with high-risk profiles. Beyond financing, venture capitalists play pivotal roles in guiding firms through strategy development, offering managerial advice and fostering network connections in exchange for shared ownership of the business, with the information and communication technology (ICT) sector being instrumental for knowledge and production networks (OECD, 2023[11]). However, VC investment in firms within the ICT sector in Norway is one of the lowest in the OECD (OECD, 2024[12]).

25. A tight labour market and the need to adapt to a highly digital economy and society in Norway add further pressure on SMEs. Recent data indicate that Norwegian medium-sized enterprises offering positions for ICT specialists (17%) lag behind the Nordic average (22%) (OECD, 2024[13]). In terms of

sophisticated technologies, Norwegian small-sized enterprises have lower adoption rates of AI (8%), IoT (22%), and 3D printing technology (3%) when compared to the Nordic average (17%, 29% and 6%, respectively) (OECD, 2024[14]). Despite these challenges, SMEs in Norway are well positioned in the development of ICT skills, with 30% of small businesses providing training to enhance these skills among their employees. Among the OECD, this places Norway behind only New Zealand (49%) and Finland (34%) in terms of ICT skills development within SMEs (OECD, 2024[15]).

26. To address these challenges and unlock the full potential of SMEs, Norway has prioritised increasing the digitalisation of SMEs in the coming years. Initiatives such as those led by Digital Norway, a non-profit organisation with a special focus on SMEs, play a crucial role in accelerating the digitalisation of Norwegian enterprises, providing free online resources and training to promote the effective use of advanced digital tools. In addition, collaborations involving data sharing, such as the incorporation of the online data repository Datafabrikken into the national open data portal data.norge.no, will further support SME participation in the data-driven economy and drive innovation.

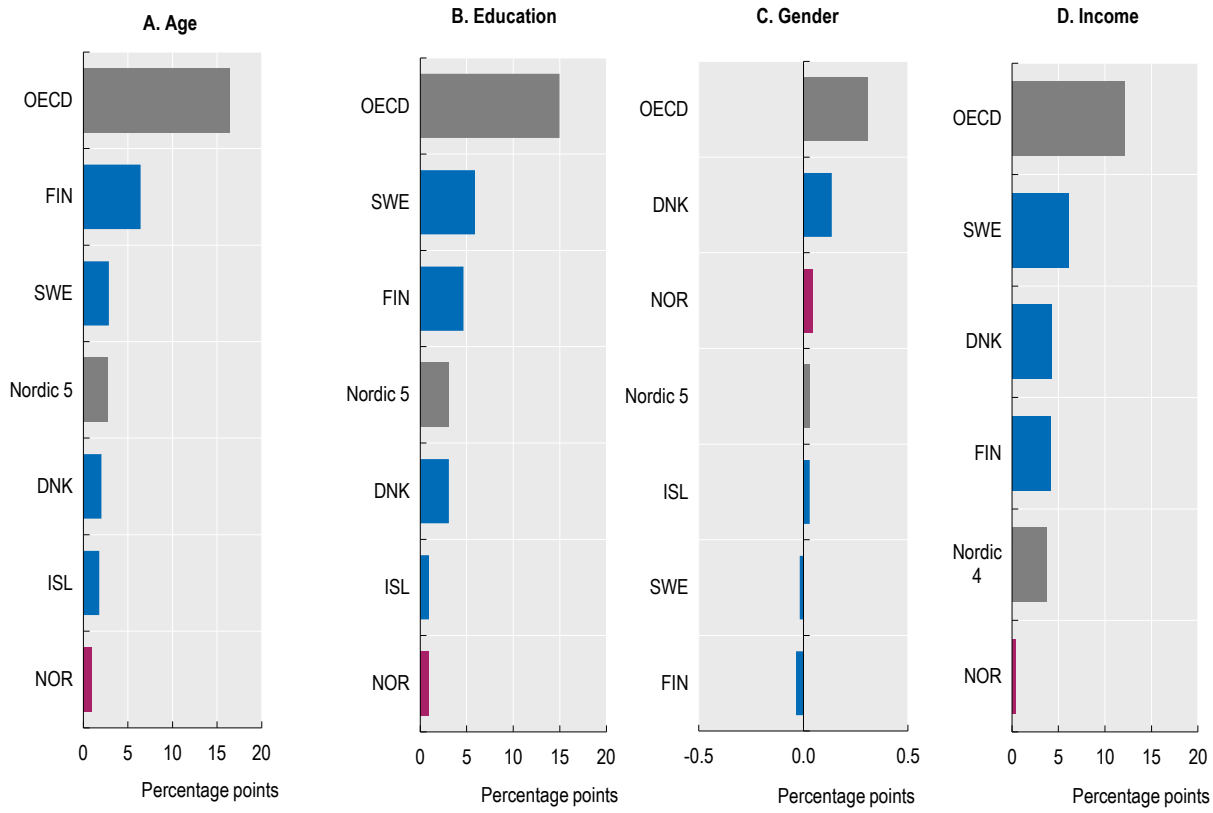
Promoting an inclusive digital society in the context of an ageing population

27. For digital transformation to work for growth and well-being, it is essential to support a positive and inclusive digital economy and society. While much progress to ensure basic connectivity has been achieved in developed countries, including Norway, digital divides still persist to some degree along a range of dimensions. Broadly speaking, digital divides refer to gaps between individuals, governments, firms and geographic areas at different socio-economic levels with respect to opportunities to access digital technologies and their use of the Internet for a wide variety of activities. In Norway, considerable focus is placed on closing digital divides.

28. In terms of Internet use, Norway's performance is exceptional (Figure 4). Differences in the share of adults using the Internet in Norway by age, education level, gender and income are significantly lower than the OECD average. In the Nordic region, such differences are lowest in Norway for age, education level and income, and while above the Nordic average for gender, at less than half of a percentage point, Norway's gender digital divide is still very small in absolute terms.

Figure 4. Internet use by demographics and socio-economic variables

Differences in the share of adults using the Internet at least once over the last three months, 2023



Note: See endnotes.[4]
Source: OECD (2024), ICT Access and Usage Databases, https://oe.cd/dx/ict-access-usage (accessed on 5 February 2024).

29. But creating an inclusive digital society involves more than simply closing digital divides. It is about ensuring that online public services are accessible to all. This means not only addressing disparities in access but also designing public services effectively, and in consultation with a wide range of different stakeholders. Consideration needs to be given to different levels of literacy and proficiency with the Norwegian language, as well as compatibility with assistive devices such as screen readers. In addition, ensuring all of society has the necessary competences to use digital technologies confidently and effectively for a broad range of applications, from e-commerce to banking to interacting with public services such as healthcare, is essential to ensuring everyone can thrive in a digital society.

Supporting the green transition

30. As a nation producing both large quantities of oil, gas and hydroelectric power, Norway will be significantly affected by the green transition. On the one hand, digital technologies can directly affect energy consumption by promoting smarter and more continuous management of electricity, for example through the widespread use of so-called “smart” meters. Digitalised energy systems can also better identify where and when energy should be delivered, with potential impacts on long-term sustainable energy production. The increased digitalisation of energy-intensive sectors also holds promise to increase the

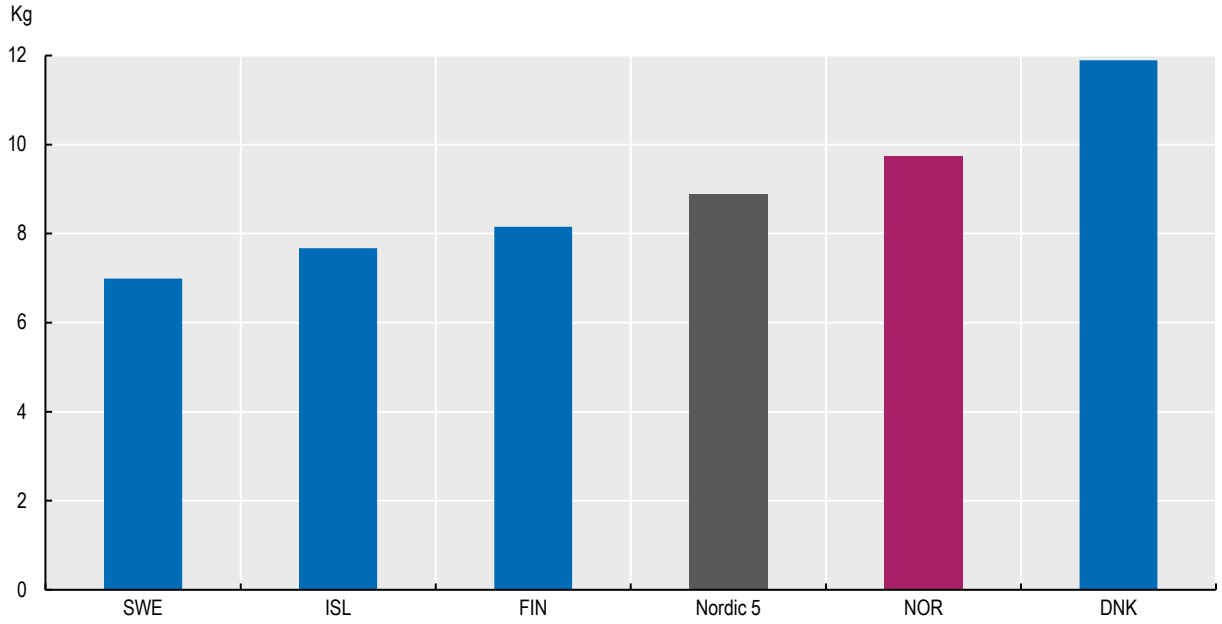
energy efficiency and sustainability of many economic and social activities. On the other hand, digital transformation enables more trade, which could change the global distribution of environmental footprints and nationally implemented recycling regimes. Similarly, demand for digital technologies may increase energy and resource demands associated with ICT production and use, offsetting some of the environmental gains they can bring.

31. In navigating the challenges posed by the green and digital transitions, Norway has invested heavily in technological development and innovation to support its green transition, as demonstrated by an increase in patents related to green technologies (The Research Council of Norway, 2021[16]). Moreover, notable progress has been made in zero and low emission technologies. For example, Norway is a world leader in zero emission vehicle (ZEV) adoption (OECD, 2022[17]) with the share of newly registered ZEVs reaching 79% in 2022.[5]

32. However, the generation of e-waste remains a challenge for the country. Since 2016, Norway has consistently held a prominent position in e-waste production per capita, with a slight decrease from 28.5 kg in 2016 to 26 kg per capita in 2019. This figure surpasses both the OECD average of 17 kg per capita and the Nordic average of 22 kg per capita. While Norway remains proactive in e-waste management by recycling more than half of its generated e-waste (OECD, 2024[18]), the gap between e-waste generation and recycling per capita remains one of the highest across Nordic countries, only behind Denmark (Figure 5). Addressing this gap is crucial for sustaining Norway's environmental goals and advancing its sustainability efforts.

Figure 5. Overall e-waste generation

Difference between e-waste generation and recycling in kg per capita, 2019



Note: See endnotes.[6]
Source: The OECD Going Digital Toolkit, based on the Global E-waste Monitor, Eurostat Waste Electrical and Electronic Equipment (WEEE) Statistics, and the OECD Annual National Accounts Database, https://goingdigital.oecd.org/indicator/53 (accessed on 16 February 2024).

33. Norway has set a clear national priority to support the green transition, recognising the importance of action in this area. Given the extent to which traditional extraction industries dominate the Norwegian

economy, the growth of digital-intensive sectors represents a clear path to Norway's future if properly managed. Norway's abundant renewable energy has the potential to power the digital revolution without increasing emissions, and new forms of employment can emerge for those willing and able to re-skill. Digitalisation can further drive efficiencies and growth, increasing prosperity and ensuring quality of life continues to improve throughout the twin transitions.

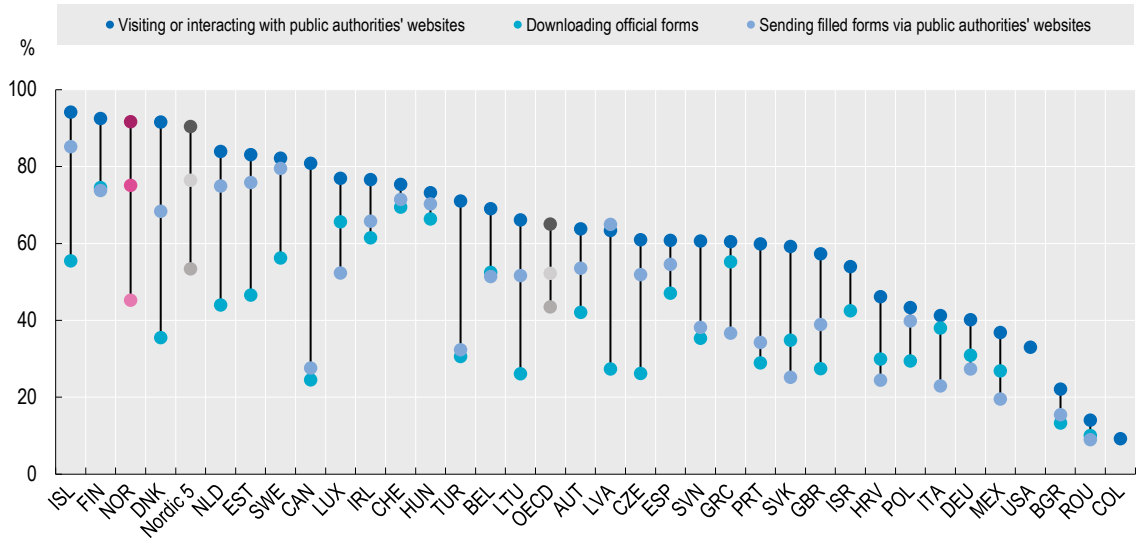
Digitalising the public sector

34. Digital government leverages digital technologies and data to deliver more effective, holistic and user-centred services, public sector innovation and stronger civic engagement. A core principle of digital government is to leverage digital technologies more fully to design, develop, deliver and monitor public policies and services centred around people and the needs of people and firms. One key enabler of wider uptake of digital services across the economy and society are digital identities (i.e. eIDs) and electronic and/or digital signatures. As the public sector both produces and consumes large amounts data, there is also significant potential for governments to use digital technologies to innovate.

35. The digitalisation of the public sector is a growing trend, but significant potential still remains in many countries for general use and wider uptake of digital government services. About 65% of people across the OECD visit or interact with public authorities' websites, less than 45% use the Internet to download or send filled forms via public authorities' websites, and 52% use the Internet to send filled forms via public authorities' websites (Figure 6). Norway outperforms the OECD on all indicators; indeed, Norway is among the leaders in the digitalisation of government services in line with other Nordic countries.

Figure 6. Uptake of digital government services

Use of digital government services by individuals, as a percentage of individuals aged 16-74, 2023 (or latest available).



Note: See endnotes.[7]
Source: OECD (2024), ICT Access and Usage Databases, https://oe.cd/dx/ict-access-usage (accessed on 5 February 2024).

36. As the government develops its new digital strategy, the use of data-driven technologies such as AI is being explored to improve government services and address critical societal issues. At the same

time, active participation in collaborative digitalisation projects across Europe underscores Norway's commitment to strengthening public sector efficiency and tackling pressing societal challenges. Within this landscape, Norway is committed to establishing a solid foundation for a mature digital government, closely aligned with the OECD's Digital Government Policy Framework (OECD, 2020[19]).

Section 2. Mapping Norway's digital policy ecosystem

37. As digital transformation accelerates, policy makers must consider not only which policies are important, but also how those policies are co-ordinated, monitored and implemented. This is because the success of policies to achieve their desired outcomes is dependent on devising effective governance regimes. This section briefly discusses the Framework, which is used as a guide to explore Norway's digital policy landscape. It then considers recent developments in the Norwegian digital policy ecosystem, including the main entities responsible for designing and implementing digital policies in Norway. This section then briefly examines Norway's current NDS – the "Digital Agenda for Norway" – as well as the wider digital policy landscape.

The Framework as a benchmark for a holistic approach to policymaking

38. Digital transformation affects almost all aspects of the economy and society, and designing effective digital policies requires a whole-of-government effort. While the effects of digital technologies and data differ depending on national context and culture, the challenge of effectively navigating the digital transition and ensuring that well-being and growth are not just protected, but enhanced, is a global one. For this reason, the OECD developed the Framework (OECD, 2020[1]), which aims to help countries to build a more inclusive and prosperous digital future with effective, impactful and evidence-based digital policies.

39. The Framework consists of seven interrelated policy dimensions (Access, Use, Innovation, Jobs, Society, Trust and Market Openness), each of which contain several policy domains (Figure 7). Growth and well-being are at its heart, and several transversal domains (investment, digital government, skills, SMEs, tax and benefits, regional development, privacy and security) cut across multiple dimensions. Some domains, such as data and data governance, are relevant for all of the Framework's dimensions.

Figure 7. The Going Digital Integrated Policy Framework

Source: (OECD, 2020[1]).

40. The Framework has been used as a guide to develop national digital strategies in OECD countries and partner economies. Other use cases of the Framework involve assessing the comprehensiveness of national digital strategies by applying the Framework as a benchmark (Gierten and Lesher, 2022[20]). Recognising the evolving nature of technology, the Framework has remained relatively flexible to accommodate changes in the digital technology landscape. It further provides guidance on the governance of digital policies to ensure coherence and co-ordination of policies across all domains and sectors that shape digital transformation, and how to involve all relevant stakeholders in the development and implementation of digital policies.

Norway's governance ecosystem

41. While governance arrangements understandably vary between countries depending on national context, research has shown certain cross-country trends appearing in the governance of national digital strategies. Most notably, there is a growing move toward the development and co-ordination of national digital strategies being led either at the Prime Ministerial or Chancellery level of government, or by a dedicated digital ministry (Gierten and Lesher, 2022[20]) (OECD, forthcoming[21]). This approach helps to ensure that digital policies are created and organised by bodies with enough specialist knowledge to design them effectively and enough clout to guarantee their implementation.

42. In October 2023, the Norwegian Government announced the creation of the Ministry of Digitalisation and Public Governance, alongside a new ministerial post with the same title, taking effect from 1 January 2024 (Office of the Norwegian Prime Minister, 2023[22]). The new department comprises elements of digital policy previously situated in the Ministry of Local Government and Regional Development. This announcement reflects the growing importance of digital transformation to the Norwegian Government and ensures the forthcoming NDS will have a dedicated home. Central to its success is the ability of the new ministry to collaborate effectively with others, given the cross-cutting nature of digital transformation.

43. The creation of the new Ministry of Digitalisation and Public Governance means most of the responsibility for designing implementing and evaluating digital policy will sit within one government body. This will be complemented by the Norwegian Digitalisation Agency (Digdir), an underlying agency within the Ministry dedicated to co-ordinating the digitalisation of the public sector. This will help create coherence in the approach and support effective co-ordination across the full range of Norwegian digital policies.

Beyond this organisation, however, there are a number of other organisations vital to the healthy functioning of Norway's digital policy governance ecosystem.

Government departments

44. As every sector of the economy digitalises, there are many circumstances where specialist and sector-specific knowledge can improve the design and delivery of policy. In Norway's case, in addition to the Ministry of Digitalisation and Public Governance, a range of other departments are responsible for preparing and overseeing elements of the digital policy landscape, and each ministry is responsible for digitalisation in their respective sector. For example, The Ministry of Justice and Public Security and the Ministry of Defence are jointly responsible for Norway's National Cyber Security Strategy, the Norwegian Ministry of Health and Care Services including the Directorate of Health is responsible for Norway's National Strategy for e-health, and the Ministry of Education and Research is responsible for skills and education policy from school age into the research setting and adult life. Effective co-ordination between and among these agencies and others will be essential for Norway to achieve its digital policy priorities.

Regulators

45. Independent regulators contribute specific expertise and ensure markets function effectively. They are responsible for upholding regulation in a fair and even-handed way and can be crucial partners to small and new firms seeking to enter tightly regulated markets by helping them to understand and comply with complex regulations. Increasingly, regulators are also helping to stimulate innovation by creating regulatory sandboxes, which ensure that new products and services can be tested and improved without fear of sanction if they do not meet existing regulations.

46. Norwegian regulators are already part of the digital ecosystem. The Norwegian Communications Authority (Nkom) and the Norwegian Data Protection Authority (Datatilsynet), both underlying agencies of the Ministry of Digitalisation and Public Governance, play an important role in digital policy making in Norway, as does the Financial Supervisory Authority of Norway (Finanstilsynet), which is responsible for operating or overseeing digital policies in financial markets. Given Norway's priorities of ensuring high quality information and communications infrastructure, developing the data economy, and fostering data protection and information security, these organisations are key components for Norway's success.

Agencies and trade organisations

47. Alongside government departments and regulators, government-funded agencies and industry-founded trade organisations can also contribute to ensuring that digital transformation works for growth and well-being. They tend to be more agile and better able to form close connections with industry participants, while benefitting from a narrower and more focused remit than government departments. In many cases, these organisations can be backed with significant amounts of government capital and have the responsibility to deliver large and important programs that have a real impact on individuals and firms.

48. In Norway, Innovation Norway and Digital Norway are both important organisations helping the government to achieve its digital objectives. These organisations work directly with individuals and firms to provide advice and guidance as well as implement government-funded programmes. Innovation Norway was founded by the Norwegian Government and specialises in helping innovative companies to grow and establish themselves overseas, while Digital Norway was founded by industry and helps SMEs to digitalise. Both organisations are integral to Norway's priority to support the further digitalisation of SMEs.

The "Digital Agenda for Norway"

49. At the centre of Norway's digital policy landscape is its NDS "Digital Agenda for Norway" which sets out how Norway can exploit ICT in the best interests of society (Norwegian Ministry of Local Government and Modernisation, 2016[23]). This report to the Storting was published in 2016 and it has two main objectives: to create a user-centric and efficient public administration and to enhance value creation and inclusion, beneath which sit five key priorities:

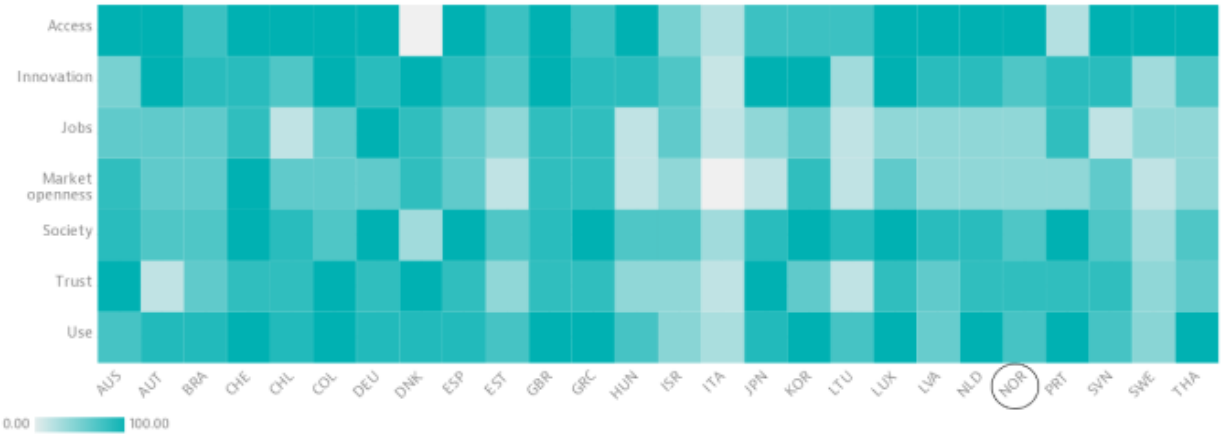
- A user-centric focus,
- ICT constitutes a significant input factor for innovation and productivity,
- Strengthened digital competence and inclusion,
- Effective digitisation of the public sector, and
- Sound data protection and information security.

50. Development, co-ordination, monitoring and evaluation of the strategy are primarily led by the Ministry of Local Government and Regional Development (now the Ministry for Digitalisation and Public Governance), with all ministries expected to contribute to and implement the strategy given the cross-cutting nature of digital transformation. Overall, the strategy has been backed with a budget of NOK 1 500 000 000 for digitalisation initiatives, which is decentralised across all of the ministries implementing the objectives in the report.

51. The comprehensiveness of the Digital Agenda for Norway was assessed using the framework as a benchmark (Gierten and Lesher, 2022[20]). The resulting National Digital Strategy Comprehensiveness indicator (NDSC) measures how comprehensively Norway's NDS covers the Framework and serves as a tool to determine how effective the NDS is likely to be in promoting a digital transition that boosts growth and well-being (Figure 8). The higher the NDSC score per Framework dimension, the more comprehensively that dimension is covered in the NDS, with each dimension scored out of a maximum of 100.

Figure 8. National digital strategy comprehensiveness across countries

2021



Note: Norway's NDSC score is based on the NDS currently in force, the "Digital Agenda for Norway" strategy. A darker colour indicates greater comprehensiveness in relation to the Framework.
Source: OECD Going Digital Toolkit, based on the OECD National Digital Strategy Database, https://oe.cd/ndsc (accessed on 14 February 2024).

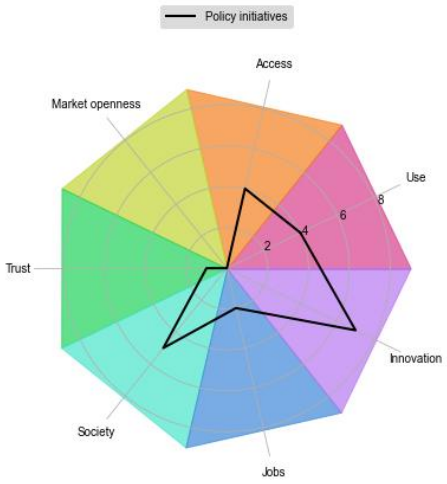
52. The NDSC for Norway shows that Access is the most comprehensively covered dimension, and the only area to achieve the maximum score of 100. This is followed by Trust with a score of 80, Use with a score of 71, and Innovation and Society with a score of 67 each. Jobs and Market Openness are the least comprehensively covered dimensions, each with a score of 40. As Norway develops its next NDS, improving its level of comprehensiveness in domains such as Jobs and Market Openness will help to ensure all areas of the Framework are implemented effectively, which will in turn help Norway achieve its digital policy priorities in a holistic manner.

Norway's digital policy landscape beyond its national digital strategy

53. Beyond Norway's NDS, the wider digital policy landscape clearly plays a definitive role in Norway's ability to achieve its policy objectives. Figure 9 shows Norway's major digital policy initiatives mapped according to the Framework's seven dimensions. At first glance, Innovation is the area with the most policy initiatives, followed by Society, Access, and Use. There are two initiatives in the Jobs dimension, and only one in Trust , while there are no initiatives in the Market Openness dimension. More detail about the policy initiatives can be found below and in Annex A.

Figure 9. Norway's digital policy landscape

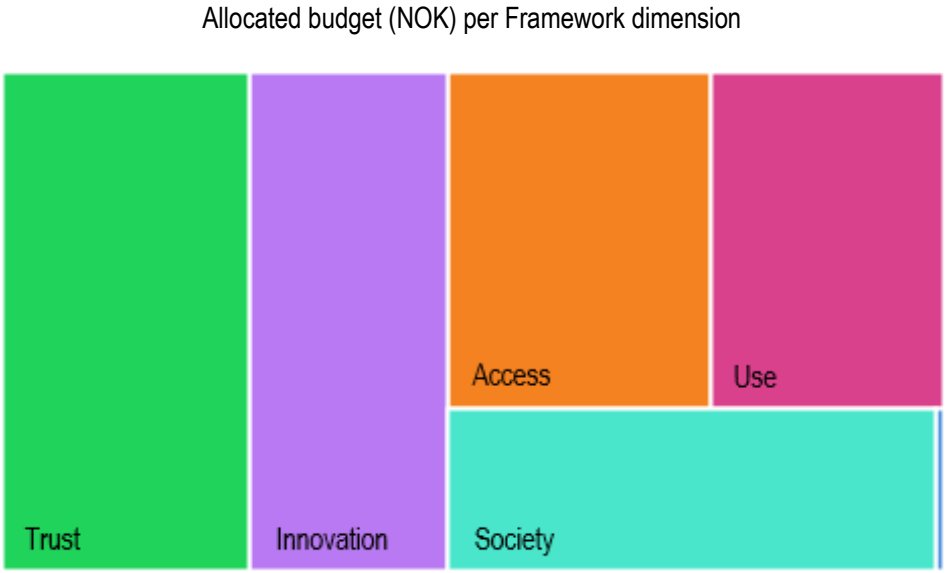
Per dimension of the Framework, 2023



Note: The depth of the colours in each of the Framework's dimensions do not represent any score or numerical value. See endnotes.[4]
Source: Authors' elaboration based on the 2024 OECD Digital Economy Outlook Questionnaire.

54. However, simply counting the number of initiatives alone is not a particularly robust method of determining the level of policy focus given to each dimension, as one well-funded and detailed initiative with clear goals and policy measures can have much more impact than several more limited and less specific initiatives. While the relationship between a policy initiative's success and its level of funding is not always linear, exploring the size of budget allocated to a specific intervention can offer clues to its likely effectiveness and the relative importance it has been given by a national government. Figure 10 provides a relative assessment of the different levels of funding allocated to each dimension of the Framework within Norway's digital policy landscape.

Figure 10. Allocated budget for Norway's digital policy landscape per Framework dimension



Note: Jobs is displayed to the right of Society. No budget is indicated for Market Openness. Some policy initiatives are relevant for more than one policy dimension; therefore, some funding has been counted in more than one dimension. The budget allocated to Meld St. 28 in the Access dimension incorporates the budget for the Broadband support scheme and the Security and resilience scheme.
Source: Authors' elaboration based on the 2024 OECD Digital Economy Outlook Questionnaire.

55. The data show a relatively even allocation of funding across most Framework dimensions, with the exception of Jobs and Market Openness, to which very little or no funding has been allocated. This is particularly surprising for Jobs, given the likely cost of delivering skills and training initiatives. Trust is the area in which the most funding has been allocated, which will help Norway achieve its priority to develop the data economy and foster data protection and information security.

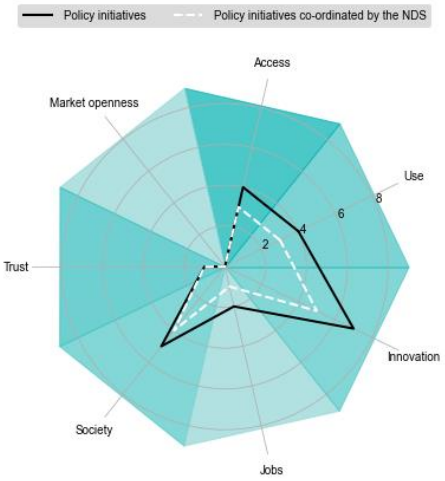
The relationship between Norway's NDS and its other major digital policies

56. A crucial determinant of the success of Norway's forthcoming NDS is the extent to which it effectively co-ordinates Norway's wider digital policy landscape. The rapid pace of technological change means obsolescence is, to a certain extent, inherent in the design of digital policies. This means new policies are almost constantly under development, and losing sight of the wider strategic direction is easy if there is not clear and explicit co-ordination between the NDS and the policy environment into which it is born. To the extent possible, clearly identifying and linking the NDS with future policies not yet fully developed also helps to ensure it will remain relevant throughout its lifecycle.

57. An analysis of how the major digital policies in Norway's ecosystem interact with its NDS reveals the extent to which the NDS acts as a strong co-ordinating force. Figure 11 combines the NDSC indicator and the assessment of the wider digital policy landscape. The results show that Norway's NDS co-ordinates most of its digital policy landscape in all dimensions. While there are a relatively small number of policy initiatives in the Trust dimension, it is the second most comprehensively covered in Norway's NDS and the area with the largest budget allocated, suggesting there is strong policy action in this dimension. Norway's NDS also co-ordinates all major policy initiatives in the Trust dimension.

Figure 11. Disentangling the relationship between Norway's NDS and its major digital policies

Norway's NDSC (heatmap) and major digital policies, 2023



Note: Norway's current NDS is the "Digital Agenda for Norway" strategy. For the NDSC (heatmap), a darker colour indicates greater comprehensiveness in relation to the Framework. See endnotes.[4]
Source: Authors' elaboration based on the 2024 OECD Digital Economy Outlook Questionnaire and the OECD National Digital Strategy Database, https://oe.cd/ndsc.

58. Innovation and Society are equally comprehensively covered by Norway's NDS, although there are more Innovation initiatives in the wider policy landscape than for Society and more funding is allocated to it. Norway's NDS co-ordinates some of the small number of Jobs digital policy initiatives. Jobs and Market Openness are the two dimensions that are the least comprehensively covered by Norway's existing NDS and that have the fewest initiatives; they likewise have the least amount of funding allocated to them. This suggests that these dimensions are in the greatest need of enhanced policy focus as Norway develops its next NDS.

59. The policy initiatives not co-ordinated by Norway's NDS tend to be either highly technical in nature or primarily implemented by a technical agency, such as the Financial Supervisory Authority's fintech regulatory sandbox. In addition to co-ordination, adequately monitoring and evaluating policy initiatives helps to ensure they achieve their desired outcomes and enables policy makers to learn lessons from past initiatives when designing future policies. The Norwegian Government has indicated that all policies within its digital policy landscape and its NDS are both monitored and evaluated (Table A A.1). Using the outputs of these monitoring and evaluation processes should help with the development of the forthcoming NDS by enabling the integration of good practice from elsewhere in the policy ecosystem.

Section 3. Situating Norway's digital performance and outlook in its policy context

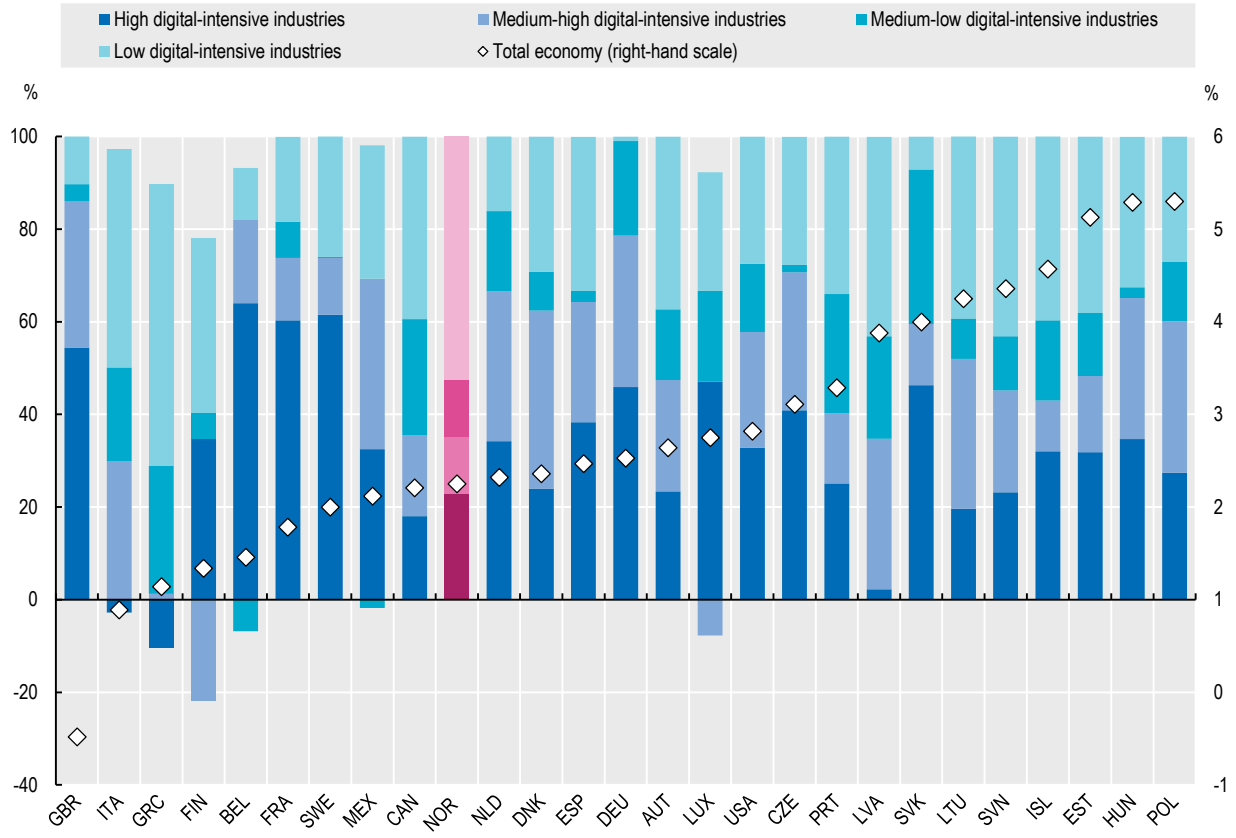
60. Shaping Norway's digital future requires policy decisions grounded in a solid evidence base. Overall, the economic outlook for Norway is characterised by high inflation and weakening domestic demand, with growth forecasted to slow in 2024 (OECD, 2023[24]). Norway's strong reliance on natural resources such as oil and gas have led to an underinvestment in innovation. Norway's inward orientation has also limited the effects of productivity-related technology spillovers from foreign direct investment and trade. With regard to the digital aspects of the economy and society, Norway performs very well overall, albeit with some areas in which there are opportunities to catch up. This section focuses on Norway's digital performance and marries it with a more in-depth discussion of the policies that underpin each dimension of the Framework.

The digital growth outlook for Norway

61. Measuring the size of the digital economy is complex, in part because digital technologies and data are everywhere to some extent. A proxy of the contribution of "the digital economy" to growth is the contribution of high and medium-high digital-intensive sectors' contribution to value added growth (Figure 12). Digital-intensive sectors are characterised by high and medium-high digital-intensity[8]. In Norway, these sectors account for 35% of value-added growth, well behind Sweden (74%), Denmark (62%), and Iceland (43%), though above Finland (13%). Norway has a resource-rich economy, with primary products such as oil, gas and fisheries contributing heavily to its GDP, and the relatively low contribution of highly digital sectors to growth relative to its neighbours suggests there are opportunities to benefit further from productivity-related spillovers from highly digitalised sectors.

Figure 12. Digital-intensive sectors' contribution to value added growth

Real value-added growth as a percentage of annual growth in real value added, chain-linked volumes, 2018 (or latest available)



Note: The growth contributions shown for each country are calculated in absolute terms and sum to 100% (or sometimes 99.9% due to rounding). See endnotes.[9]

Source: The OECD Going Digital Toolkit, based on the OECD Structural Analysis (STAN) Database, http://oe.cd/stan, https://goingdigital.oecd.org/indicator/08 (accessed on 2 February 2024).

62. While all sectors of the economy are digitalised to some extent, the ICT sector remains at the core of digital transformation, and it is critical to supporting further digital innovation. However, sectoral growth rates published in official statistics have a considerable lag. New estimates of the growth of the ICT sector in real-time based on artificial neural network model that leverages online search data (OECD, forthcoming[25]) provides insights into how the ICT sector is performing today, which will in turn help inform policy decisions that impact this important sector of the economy in the future. Figure 13 shows the evolution of ICT sector growth and total economic growth in in Norway and the OECD over the past decade. While ICT growth in Norway has been consistently positive during this period – even in the face of the COVID-19 pandemic – it has been well below the OECD average. In 2023, it is estimated that the growth rate of the ICT sector in Norway was 4.7%, below the OECD average of 7.6%.

Figure 13. The growth outlook for Norway

ICT sector and total economy (2013-2023)

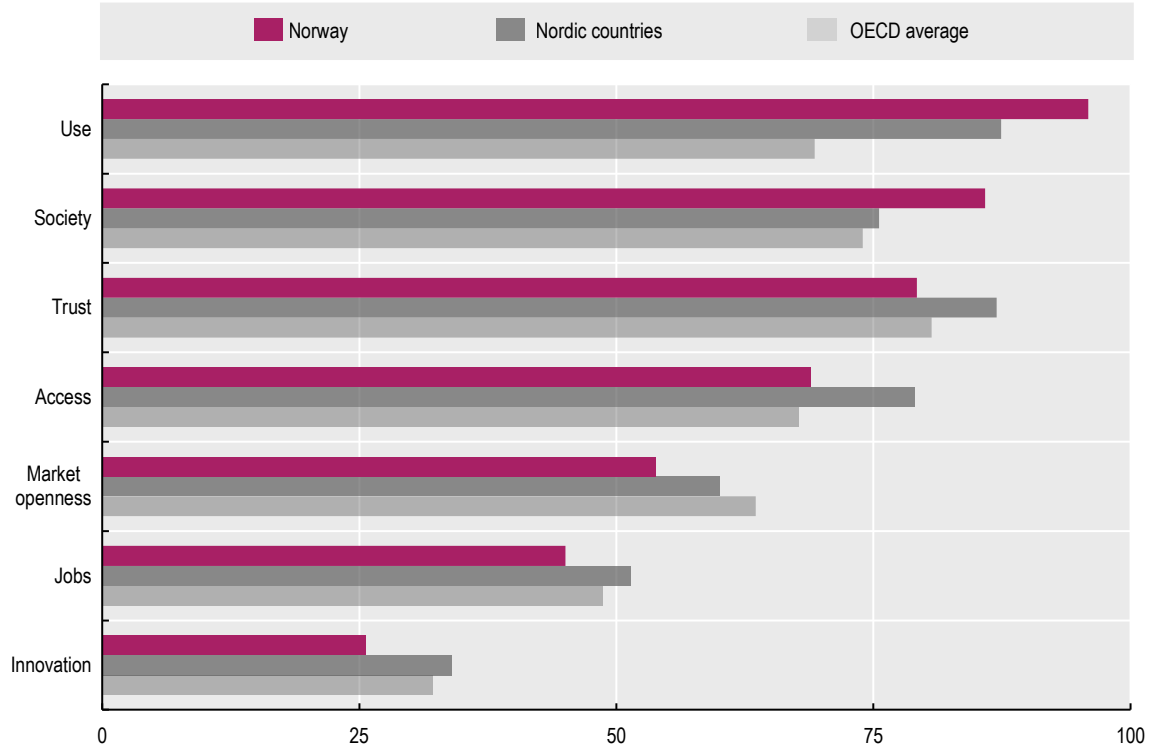
Note: See endnotes.[10]
Source: Data from 2013-2018 come from the OECD STAN database http://oe.cd/stan; nowcast estimates of the growth rate of the ICT sector for 2019-2023 come from (OECD, forthcoming[25]), and nowcast estimates of the growth rate of the total economy for 2019-2023 come from the OECD Weekly Tracker (https://www.oecd.org/economy/weekly-tracker-of-gdp-growth).

Norway's digital performance through the lens of the Framework

63. The Framework provides a useful lens to assess digital performance compared to digital policy settings using the same conceptual underpinning. The Nordic region is generally a strong digital performer, and Norway is no exception. Norway is a digital front-runner in indicators related to effective use of digital technologies and the societal dimension of digital transformation, outperforming the OECD and Nordic averages (Figure 14 and Figure A B.1). Indeed, Norway is the best performing OECD country in select indicators in both of these dimensions, particularly in effective Use, where it is best in class.

Figure 14. Overview of Norway's digital performance

By dimension of the Framework, 2023



Note: Scores express each country value as a proportion of the best performing country value, which is set equal to 100.
Source: Authors' elaboration based on the indicator overview of Norway on the Going Digital Toolkit, https://goingdigital.oecd.org/en/countries/nor (accessed on 8 February 2024).

64. Norway also performs strongly in Trust in digital environments and in Access to communications infrastructures, services and data. Market openness in digital business environments and Jobs fit for the digital age are the next best performing dimensions, with outstanding performance in indicators related to teleworking, training, and low barriers to digital services, but with opportunities to catch up in indicators related to the number of science, technology, engineering and mathematics (STEM) graduates, jobs in digital-intensive sectors and cross-border e-commerce. The dimension that clearly lags behind relates to digital Innovation, where Norway performs below the OECD average in all of that dimension's indicators and behind the Nordic average overall.

Access to communications infrastructure, services and data

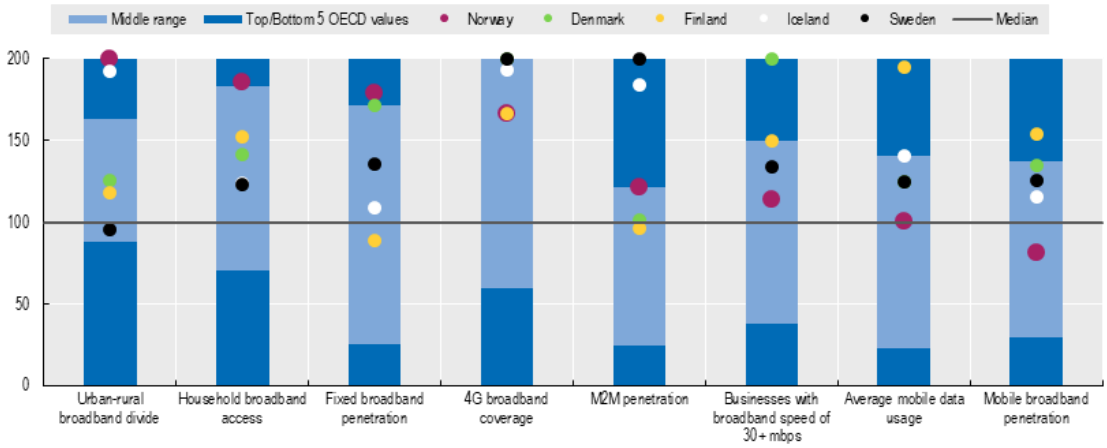
65. Communications infrastructures and services are the backbone of digital transformation, facilitating interactions between connected individuals, organisations and machines. Ensuring access to high-quality communication networks and services at competitive rates is essential for driving digital transformation. Demands for networks are growing as more people, things and activities go online. Likewise, data is increasingly recognised as a foundation for digital transformation, fuelling economic activity and productivity.

66. Norway has identified a range of priorities relevant to the Access dimension, ensuring high-quality information and communications infrastructure and developing the data economy. With much of its

population and landmass situated north of the Arctic Circle, ensuring Norwegian citizens are connected to essential services and the rest of society in all seasons is a significant undertaking. Moreover, while digital technologies can provide seamless connectivity, they depend on a reliable power supply and resilient physical infrastructure. Despite the geographical hurdles, Norway is within the top tier of the best performing OECD countries in some Access indicators, and it is at or above the OECD median in all but two indicators (Figure 15).

Figure 15. Norway's performance in the Access dimension

Normalised index of performance relative to the OECD median (index median = 100), 2023 (or latest available)



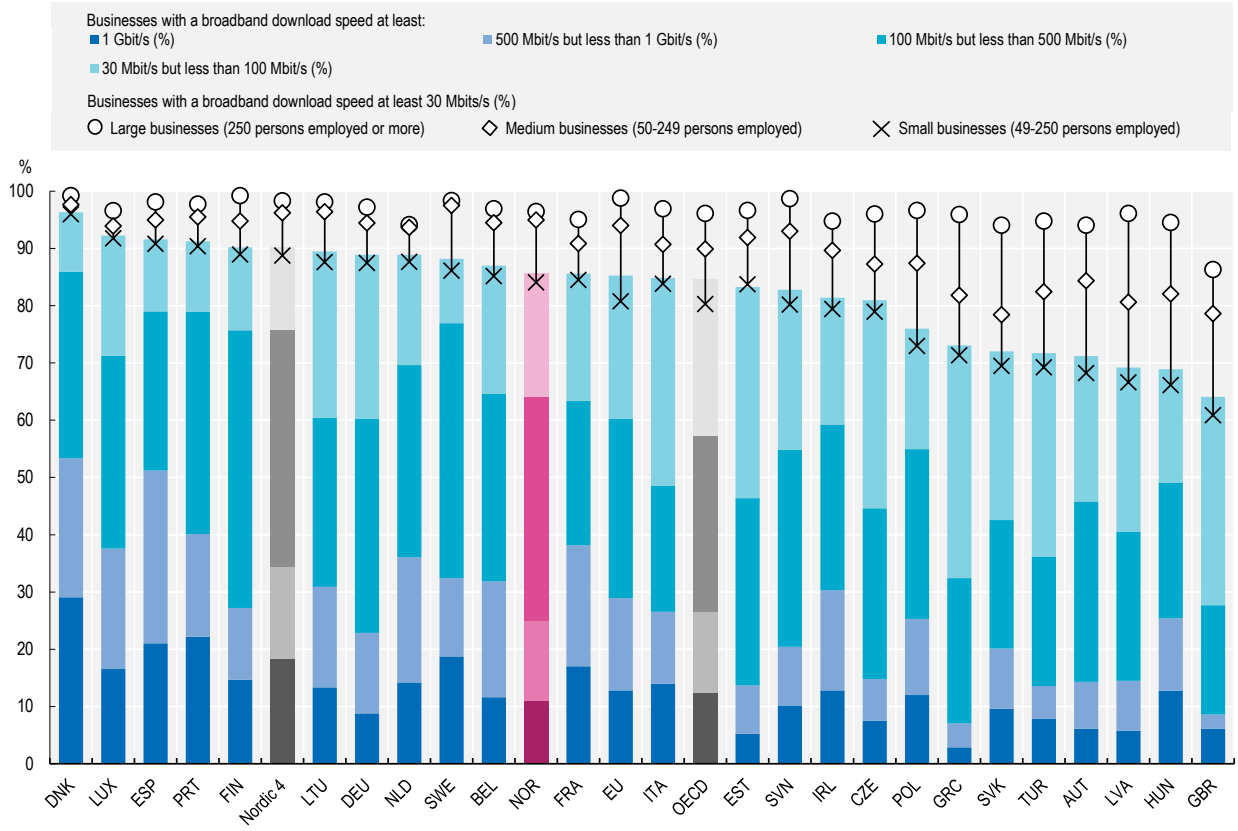
Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]

Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/access (accessed on 7 February 2024).

67. Access to communication infrastructures and services is unparalleled for a country of its size. As of 2023, fixed or mobile broadband services, with an advertised speed of at least 256 Kbps, reached an impressive 99% of households in rural and large urban areas, only behind Korea and Switzerland. Moreover, Norway consistently secures a top position in fixed broadband penetration, maintaining the highest subscription rates, alongside countries like Denmark, France, the Netherlands and Switzerland since 2010 (OECD, 2023[26]). The share of enterprises with a contracted broadband speed of 30 Mbps or more is 86%, close to the Nordic (87%) and OECD (84%) averages, but with a noticeable gap between small (83%) and large (96%) and medium-sized enterprises (95%) (Figure 16), However, performance noticeably drops off at higher speed tiers, with Norway falling below the OECD average for businesses connected to broadband services of 500Mbps, and falling behind both the OECD average and the performance of other Nordic nations for businesses connected to broadband services of at least 1Gbps (OECD, 2024[4]). These higher speed tiers are more likely to be required for digital-intensive businesses, including the implementation of data-heavy technologies such as AI and virtual reality (VR).

Figure 16. Share of businesses with broadband contracted speed of 30 Mbps or more, 2022

All businesses (excludes financial sector, 10 persons employed or more)



Note: Fibre covers fibre to the premises (FTTP) and fibre to the building (FTTB). See endnotes.[12]
Source: The OECD Going Digital Toolkit, based on the OECD ICT Access and Usage by Businesses Database (https://oe.cd/dx/ict-access-usage), https://goingdigital.oecd.org/indicator/14 (accessed on 16 February 2024).

68. When it comes to the uptake and use of mobile broadband, performance is mixed. By 2021, nearly all Norwegians were served by at least a 4G mobile network (OECD, 2024[5]), which is an essential infrastructure for the roll-out of the IoT. Machine-to-machine (M2M) communication penetration – which enables applications and services based on data collected from devices and objects – has also increased rapidly in the last few years. The number of M2M SIM cards[13] used in the country has increased from 33 per 100 inhabitants in 2018 to 72 in 2022 – although the number is still below the Nordic average of 110 (OECD, 2024[27]). Despite this, the share of Norwegian households with mobile broadband Internet access at home (40%) lags both the OECD average (58%) and other Nordic countries (OECD, 2023[28]). In addition, while mobile data usage in Norway (12GB/subscription/month) exceeds the OECD average (10GB/subscription/month), the next closest Nordic country (Sweden) uses over 50% more data per mobile subscription per month (19GB) (OECD, 2023[29]). This suggests either that Norwegians tend to use less data-intensive mobile applications or that pricing or infrastructure quality is restricting more intensive use.

Norway's policy landscape related to Access

69. Norway's position as a digital front-runner is in part due to its excellent connectivity. It is therefore no surprise that the Access dimension is both one of the most well-funded and well-covered dimensions in Norway's digital policy landscape. Norway's main policy initiative in the Access dimension is "Our

common digital foundation" (Norwegian Ministry of Local Government and Modernisation, 2021[30]), which sets ambitious coverage targets such as universal coverage of 100Mbps broadband, with gigabit coverage available to certain sectors (such as public administration, education, traffic hubs and emergency services) by the end of 2025. This initiative also set an objective for 2025 to provide 5G coverage to all areas covered by 4G as of 2020.

70. Given more than a quarter of Norway's population live in remote areas (compared to an OECD average of just under 10%) (OECD, 2022[31]), polices designed to ensure equitable Internet access for all citizens have particular salience. To achieve this, the Norwegian Government has two distinct yet linked policy initiatives. First, an optional discount of up to NOK 560 million was made available to bidders in Norway's 2021 spectrum auction who agreed to provide broadband services of 100Mbps in rural areas. Complementing this is the broadband support scheme, which provides an annual state aid grant to connect premises not covered by commercial deployment. In 2024, the amount approved by the Norwegian Government was NOK 400 million (appx. EUR 35 million).

71. Beyond investment, connectivity and regional development, the Norwegian Government has also put in place initiatives designed to increase the security and resilience of the telecommunications network. While power outages in Norway are relatively rare, severe weather events such as heavy snowfall and high winds are the main cause of disruption, and research shows communications network outages are Norwegian households' primary concern in the event of electricity disruption (Wethal, 2023[32]). Given the Norwegian Government has placed great importance on preparing for the twin transitions (digital and climate), action in this area is sensible given the likelihood of increased disruption in future due to climate change. In 2024, the Norwegian Government will spend a total of NOK 188 million on activities to improve security and resilience in the Norwegian electronic communications networks, inter alia on power backup on mobile stations and improved resilience in vulnerable regions.

72. For Norway, the challenge in the Access dimension is less about getting ahead than staying ahead. Achieving universal coverage of 100Mbps broadband in such a challenging geography for communications infrastructure and delivering the gigabit speeds needed in the future will be much more challenging given they cannot currently be delivered reliably using wireless technology, especially over the long distances required to serve Norway's rural communities. Getting the next generation of Access policies right will require maintaining a thriving and competitive commercial market, while making sure sufficient investment is available to ensure Norway's rural north is not left behind when it comes to access to next generation communication networks.

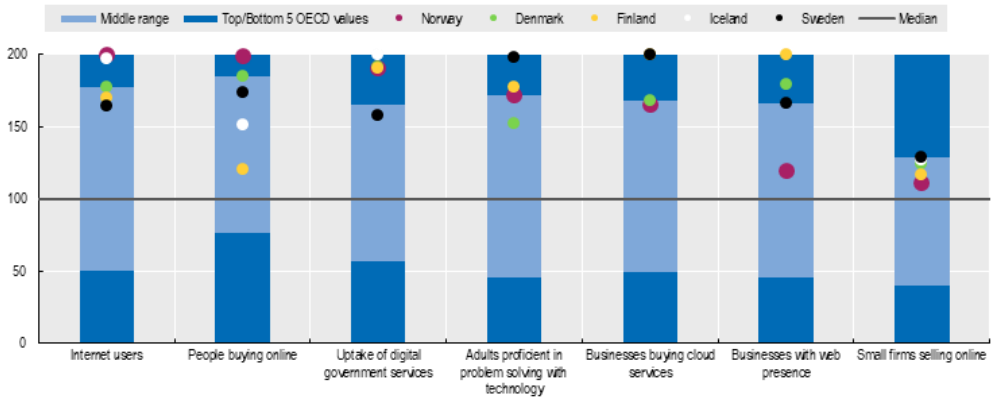
Effective use of digital technologies and data

73. The power and potential of digital technologies and data for individuals, governments and firms hinges on their effective use. Promoting the adoption, diffusion, and proficient use of advanced digital tools is crucial, especially among SMEs. Policies aimed at equipping people with the skills to use digital technologies effectively, and at promoting the adoption and diffusion of advanced digital tools, can boost productivity growth in firms and enhance the reach and quality of public services.

74. Norway has identified a range of priorities relevant to the Use dimension, including developing the data economy, increasing the digitalisation of SMEs, digitalising the public sector and promoting digital inclusivity, particularly in the context of an ageing society. Overall, Norway excels in the effective use of digital technologies – the country is among the first tier of best performing OECD countries (Figure 17).

Figure 17. Norway's performance in the Use dimension

Normalised index of performance relative to the OECD median (index median = 100), 2022 (or latest available)



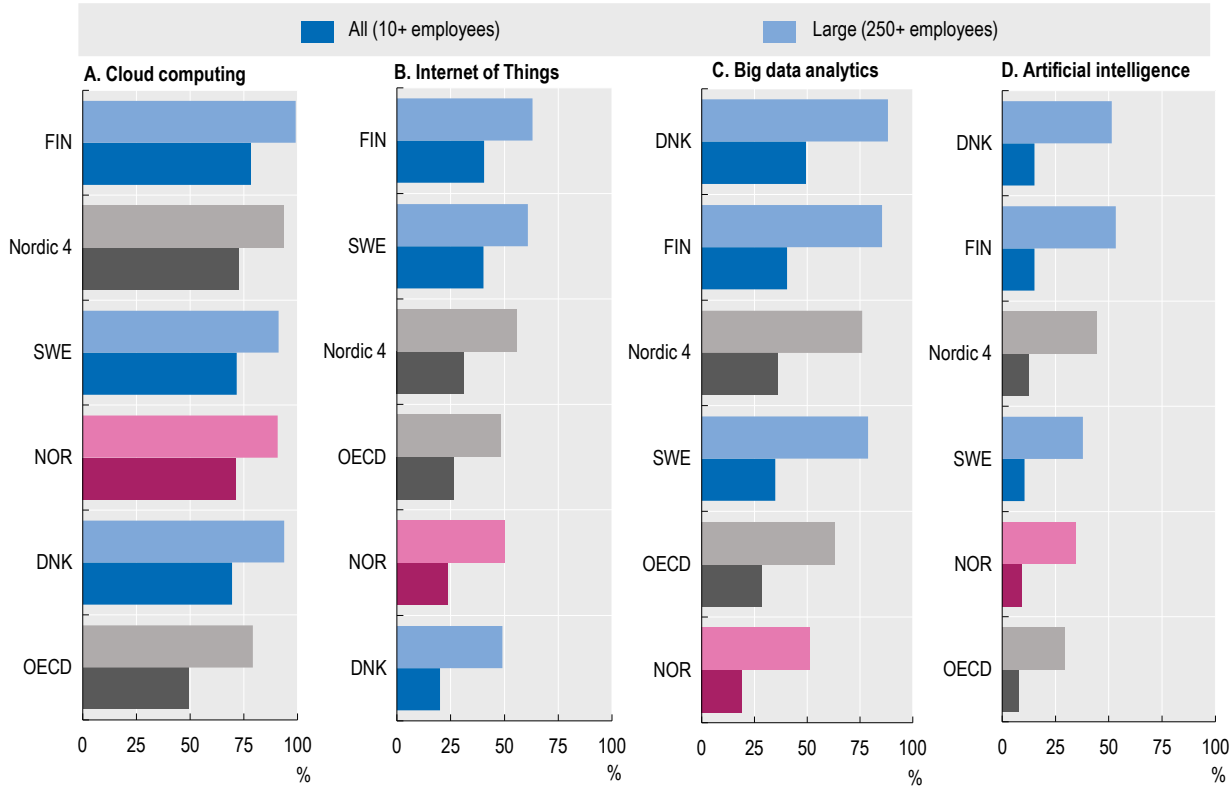
Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]
Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/use (accessed on 7 February 2024).

75. Norway has consistently led the way in Internet adoption, with an impressive 96% of people aged 16-74 being frequent Internet users (OECD, 2024[33]). The prevalence of Internet users purchasing online (92%) is among the highest in the OECD, along with the Netherlands and the United Kingdom (OECD, 2024[34]). In addition, Norway stands out for its robust online business presence, with 83% of Norwegian companies maintaining a website or homepage in 2022, although slightly behind the Nordic average of 90% (OECD, 2024[35]).

76. As digital transformation continues, digital tools have become indispensable for the effective use of technology. Sophisticated technologies such as cloud computing, IoT, big data analytics and AI are crucial for improving business efficiency. Cloud computing in particular has been widely adopted by Norwegian companies, with the majority of companies with ten or more employees closely matching the Nordic average and exceeding the OECD average. However, adoption of IoT technologies, big data analytics and AI is relatively low and lags behind the Nordic average (Figure 18). Larger companies are more likely adopters of these advanced technologies, highlighting the importance of further investment in skills. For all firms, a shortage of more advanced ICT skills appears to be slowing the rate of digitalisation in the private sector (KPMG, 2020[36]).

Figure 18. Adoption rates of cloud computing, IoT technologies, big data analytics and AI, 2021-23

As a percentage of businesses with 10+and 250+ employees



Note: Enterprises with ten employees or more in the business sector (excluding financial services). See endnotes.[14]
Source: OECD (2024), ICT Access and Usage Databases, https://oe.cd/dx/ict-access-usage (accessed on 5 February 2024).

Norway's policy landscape related to Use

77. Norway's impressive Internet usage statistics point to a population of early adopters with a solid foundation of basic skills. Use is the dimension that corresponds to the highest number of Norway's national digital priorities, and therefore achieving success in this area is critical as Norway plans for the future. With over NOK 1 billion allocated over three large, multi-year policy initiatives, it is clear that providing and improving digital public services, teaching foundational skills, and ensuring as much of Norwegian society as possible is able to benefit from digital transformation are priorities for Norway.

78. The Norwegian Government's current digital government strategy is "One digital public sector" (Norwegian Ministry of Local Government and Regional Development, 2019[37]), though a new comprehensive strategy encompassing digital government and the digital economy is under development. This strategy has been supported by a budget of NOK 1 billion and aims to boost the digitalisation of Norway's public sector by improving the quality and breadth of digital public services, increasing co-ordination within the public sector and co-operation between the public and private sectors by creating a common ecosystem and improved procurement processes, and building the digital competences of public sector employees. Beyond this, other initiatives in the Use dimension focus on improving basic ICT skills for all citizens and improving the innovative potential of the public sector.

79. Policy domains within the Use dimension for which Norway currently lacks a detailed policy response relate to increasing business dynamism and helping SMEs to digitalise, the latter of which is a stated priority for Norway. One response is a new plan for reforming the further education sector to better

equip it to nurture the skills needed for a modern, digital economy (Norwegian Ministry of Education, 2023[38]). In addition, the trade organisation Digital Norway is backed by the Government and provides guidance and short training courses specifically targeted at SMEs seeking to digitalise. Despite this, there is scope for additional policy development in this area moving forward, including further incentives to encourage firm digitalisation, which one can expect to result in higher uptake of available courses and increased expenditure on ICTs, which is relatively low for a country as digitally advanced as Norway.

80. Regarding business dynamism, there are indications of some reticence among Norwegian firms to "take the plunge" and pursue large-scale digital transformation projects building on successful limited pilots (2024[39]). In part this may be attributed to a historically strong economy based on the extraction of raw materials, where the business case for digitalisation is not always clear cut. In addition, a national business culture in which taking risks is often not encouraged could be another contributing factor. A consideration of policies designed to increase business dynamism, such as changes to insolvency regimes to make bankruptcy less penalising (Adalet McGowan and Andrews, 2018[40]), may be relevant in the context of the forthcoming NDS.

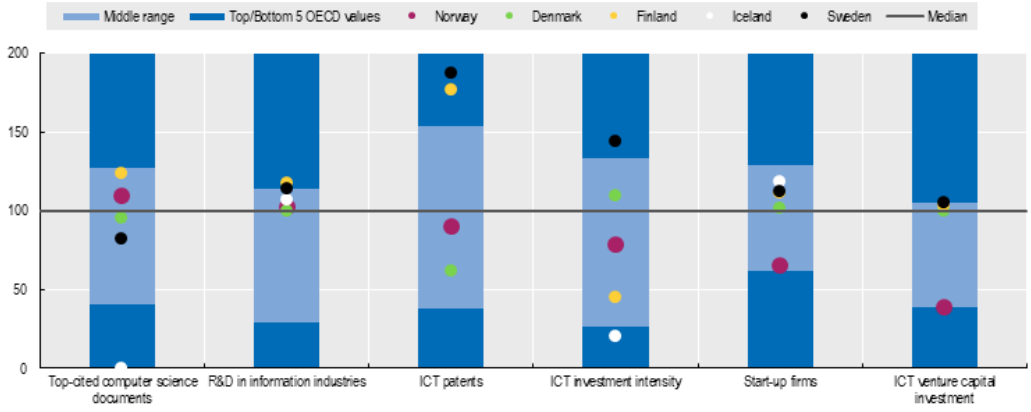
Data-driven and digital innovation

81. Innovation helps to push out the frontier of what is possible in the digital age, driving job creation, productivity and sustainable growth. The formation of new companies, and the spread of new ideas in existing ones, leads to better and more effective service provision, and creates new products and business models that can have profound positive effects on society at large. Progress in the Innovation dimension requires specific measures to support and stimulate innovative entrepreneurs and SMEs, alongside balancing competition regimes to allow new entrants to disrupt existing markets. Discovery is an important enabler of innovation, and therefore stimulating and commercialising scientific research is key. Sectors such as healthcare, agriculture and the public sector need to be ready to experiment and implement new technologies, which may require reforms and dedicated strategies or policy measures.

82. Norway has prioritised increasing the digitalisation of SMEs and the public sector, as well as developing the data economy, which are all priorities relevant to the Innovation dimension. Progress is paramount for advancing these objectives, particularly as Norway lags behind the other Nordic countries and ranks below the OECD median for most related indicators (Figure 19).

Figure 19. Norway's performance in the Innovation dimension

Normalised index of performance relative to the OECD median (Index median = 100), 2022 (or latest available)



Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]

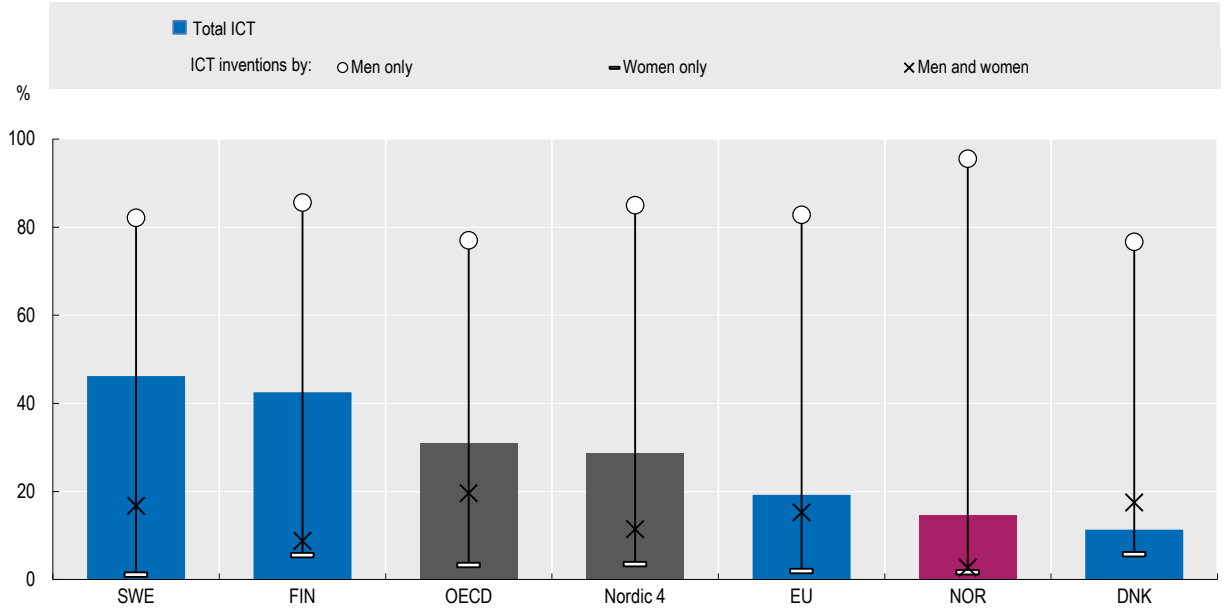
Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/innovation (accessed on 7 February 2024).

83. While Norway has established itself as a strong innovator overall, it faces challenges in catching up with its Nordic neighbours in terms of its digital innovation performance. In contrast to Sweden and Finland, which are home to globally recognised companies like Spotify and Nokia, Norway's industrial innovation is not heavily focused on ICT companies (Parmiggiani and Mikalef, 2022[41]). As a result, Norway is far from realising its full digital innovation potential.

84. Promoting digital innovation requires intangible assets such as patents and software, yet Norway faces a notable disparity when compared with its Nordic counterparts in terms of intellectual property (IP) related to the ICT sector. Data from 2019 reveal that only 14% of all Nordic patents in Norway were in ICT, a substantial lag behind Sweden (46%), Finland (42%) and the Nordic (29%) and OECD (31%) averages (Figure 20, Panel A). Furthermore, Norway's share of top 10% most-cited documents in computer science as a share of the top 10% in all fields has consistently remained below the Nordic and OECD averages since 2010 (Figure 20, Panel B). Adding to this, Norway's investment in ICT as a share of GDP has shown a tendency to remain at low levels. In 2022, ICT investment as a share of GDP was 2%, below the Nordic (3%) and OECD (3%) averages (OECD, 2024[42]).

Figure 20. Innovation activity in Norway

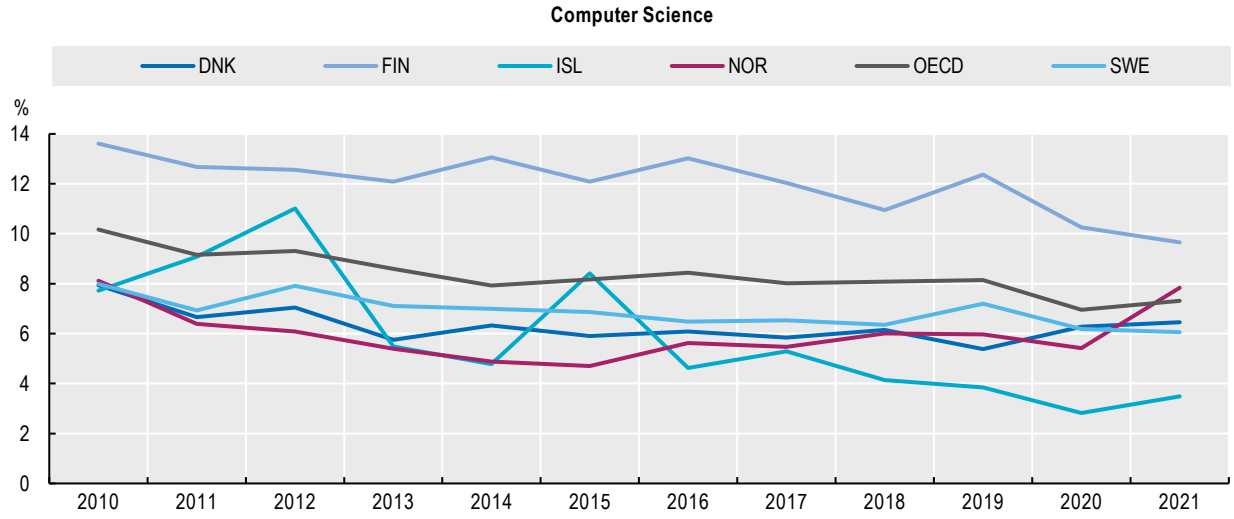
Panel A. Patents in ICT technologies, as a share of total IP5 patent families, 2019



Note: Patents protect technological inventions (i.e. products or processes providing new ways of doing something or new technological solutions to problems). See endnotes.[15]

Source: The OECD Going Digital Toolkit, based on the OECD STI Micro-data Lab: Intellectual Property Database, http://oe.cd/ipstats, https://goingdigital.oecd.org/indicator/33 (accessed on 16 February 2024).

Panel B. Top 10% most-cited documents in computer science as a share of the top 10% ranked documents in all fields (2010-2021)



Note: Top-cited publications are the 10% most-cited papers normalised by field and type of document (articles, reviews and conference proceedings). See endnotes.[16]

Source: The OECD Going Digital Toolkit, based on the OECD calculations using Scopus Custom Data, Elsevier, and Scimago Journal Rank from the Scopus journal title list, https://goingdigital.oecd.org/indicator/32 (accessed on 7 February 2024).

85. Access to finance is also an essential part of the digital innovation landscape, and venture capital (VC) investment is an important source of funding, especially for high-risk and innovative firms. However, recent data indicates that VC investment in firms within the ICT sector in Norway is among the lowest across the OECD, accounting for only 1% of the GDP in 2022 (OECD, 2024[12]). This extends to VC investments in AI, where Norway's share is relatively low considering its GDP (OECD, 2024[43]). The shortfall of VC investment can impact the start-up ecosystem, hindering essential resources for young firms to thrive. Norway lags behind other Nordic countries in terms of start-up firms in information industries[17]. In 2021, the share of start-up firms in information industries was as low as 24%, below the Nordic average of 32% (OECD, 2024[44]). Norway is also home to only just over a quarter of the number of unicorns as neighbouring Sweden (11 versus 42) (Dealroom.co, 2024[45]).

86. Looking at research and development (R&D) as a share of GDP provides another perspective on Norway's digital innovation. While Norway experienced robust growth in R&D as a share of GDP (GERD) in 2015 (9%) and 2017 (7%), the following years saw lower increases of 2-3%, and in 2020 Norway allocated 2% of its GDP to R&D (The Research Council of Norway, 2021[16]) with the private sector contributing to almost half of the investment. However, in the information industries, which is crucial for digital innovation, business expenditure on R&D as a share of GDP (BERD) in Norway (0.4%) is below Finland (0.7%), Sweden (0.7%) and the Nordic average (0.5%) (OECD, 2024[46]).

87. Nonetheless, the Norway has made efforts to foster digital innovation in the public sector. This is evident in its commitment to delivering innovative services (OECD, 2017[47]) and developing integrated digital systems for data sharing across sectors. This commitment has led to the early creation of innovative public portals such as Altinn and ID-porten, which facilitate digital communication, identification and authentication between public authorities, citizens and businesses (Norwegian government, 2024[48]) (Parmiggiani and Mikalef, 2022[41]). The tangible impact of these efforts is reflected in the impressive statistic that in 2022, 91% of the Norwegian population used the Internet to interact with public authorities (OECD, 2024[49]).

Norway's policy landscape related to Innovation

88. Somewhat paradoxically, Innovation is the Framework dimension in which Norway has the highest number of major digital policy initiatives, particularly with respect to data. Norway's landmark "Data as a resource" paper, backed with NOK 300 million of investment, sets out the immense potential for value creation in both the public and private sectors resulting from increased sharing of and innovation with data (Norwegian Ministry of Local Government and Modernisation, 2021[50]). This detailed policy document shows that Norway is right at the front of the pack when it comes to developing policies designed to foster data-driven innovation and the positive impacts it can have on all parts of the economy and society.

89. This culture of data innovation is further reinforced by two separate regulatory sandboxes. The first is the Norwegian Data Protection Authority's sandbox for responsible AI, which aims to stimulate responsible AI innovation by providing free guidance to a selection of qualifying companies of various size and across different industries (Datatilsynet[51]). The Financial Supervisory Authority of Norway has run a similar initiative since 2018, which aims to help fintech firms to launch new innovative products by gaining a better understanding of the regulations required. In return, the Supervisory Authority is able to gain useful insights into new technological developments that help it anticipate future regulatory challenges.

90. Thanks to an abundance of clean energy generated by an advanced hydropower industry (Business Norway, 2023[52]) as well as an Arctic climate and excellent connectivity, Norway has a natural potential for data centres, something which has been seized upon by the Norwegian Government in its 2021 Data Centre strategy, which aims to facilitate the sustainable development of the data centre industry in Norway by providing specific guidance for foreign companies (Norwegian Ministry of Local Government and Modernisation, 2021[53]).

91. Norway has also produced extensive policy work in the science and technology policy domain. The latest iteration of Norway's "Long-term plan for research and higher education" (Norwegian Ministry of Education and Research, 2023[54]) was published in 2023. The new strategy sets out ambitious proposals aimed to enhance Norwegian competitiveness and innovation capacity while boosting scientific research in six priority areas, including a range of industrial technologies such as AI, advanced robotics and quantum technology. The strategy includes an objective to increase R&D expenditure from business and industry to 2% of GDP by 2030 and was accompanied by an announcement from the Government to dedicate NOK 1 billion to AI research over the next five years.

92. Norway's 2020 "National Strategy for Artificial Intelligence" sets in place foundational measures designed to address emerging challenges related to ethics, infrastructure and skills Norway must solve to realise its potential as an AI leader (Norwegian Ministry of Local Government and Modernisation, 2020[55]). The strategy is designed to be open-ended in recognition of the rapidly evolving policy environment, and the forthcoming NDS could be an opportunity to refresh the current position in light of the recent emergence of large language models (LLMs).

93. The Government-founded organisation Innovation Norway provides funding and guidance to innovative companies, including those in early-stage, however additional policies designed to stimulate entrepreneurship and SME growth could be beneficial in helping young companies to thrive. This could include increasing access to patient and risk-tolerant capital at seed stage that recognises firms in emerging areas may not guarantee immediate returns or find immediate success, or by building incubators.

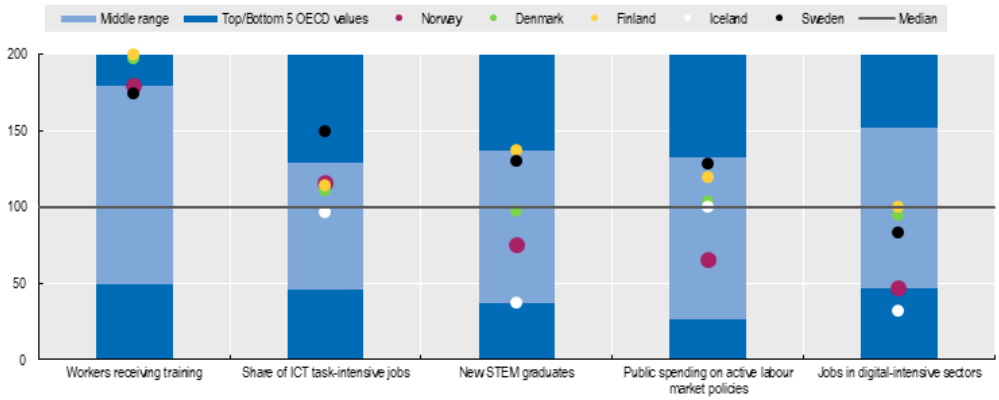
94. A general culture of risk aversion among Norwegian businesses and investors could also hinder Norway's ability to fully capitalise on its innovative potential. Policies designed to encourage start-ups from research institutions and reforms that ensure business failure or insolvency is not overly penalised may help to foster a more entrepreneurial spirit and lead to value creation through increased start-up success. In addition, measures in the competition policy domain, such as a review of regulatory frameworks to ensure they do not favour incumbents, may encourage new market entry and disruption and further boost Norway's innovative potential.

Jobs fit for the digital age

95. Digital transformation leads to creative destruction, with jobs being lost and others being created. As labour markets transform, many of the new jobs are likely to differ from the ones we know. Empowering people with the mix of skills needed to succeed in a digital world of work, including by improving education and training systems throughout the life cycle, facilitating job-to-job transitions and ensuring adequate social protection, is essential. Some workers are likely to benefit more from digital transformation than others, and an adequate safety net is needed to ensure a successful and fair transition for all. Overall, Norway's performance in the Jobs dimension falls within the mid-range among OECD countries but lags behind most of its Nordic counterparts (Figure 21).

Figure 21. Norway's performance in the Jobs dimension

Normalised index of performance relative to the OECD median (index median = 100), 2022 (or latest available)



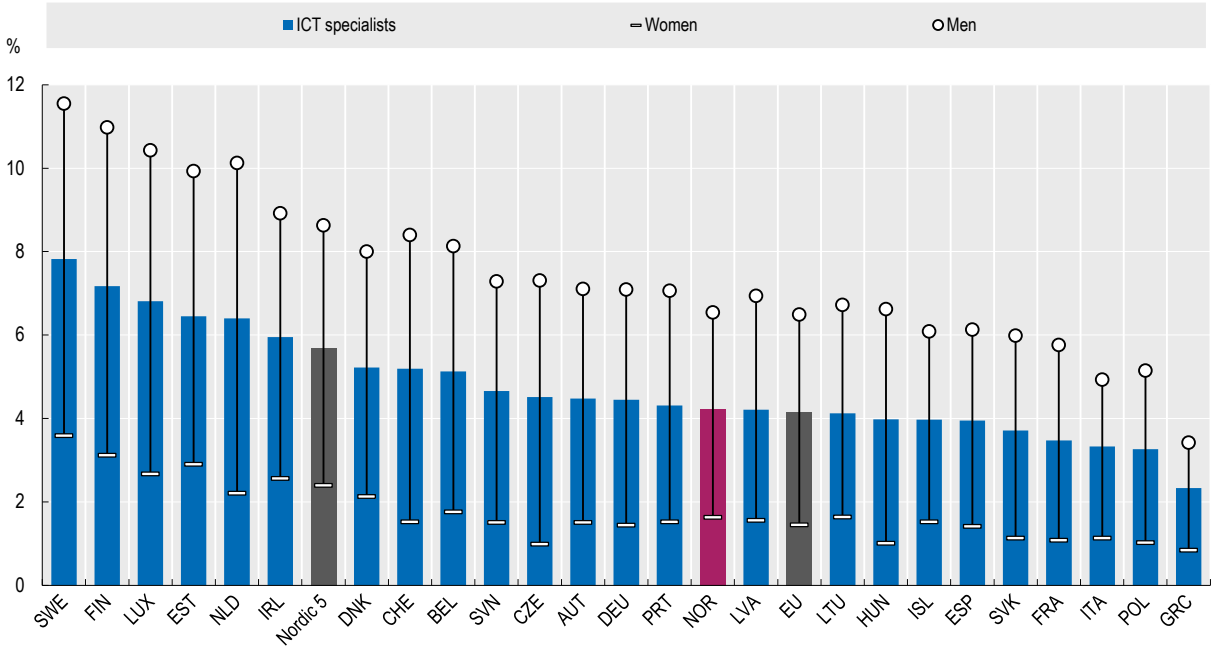
Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]
Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/jobs (accessed on 7 February 2024).

96. Norway's performance in the Jobs dimension is mixed. Norway's extremely high levels of digital literacy, well-educated population and high employment rate[18] mask some alarming trends. Attainment in foundational subjects such as maths, science and reading is declining (see Society section), while education inequality is increasing alongside the skills gap reported by Norwegian companies (Norwegian Confederation of Business (NHO), 2022[56]).One notable concern is an increase in labour market tightness in recent years, measured by the number of vacancies per unemployed person (OECD, 2023[57]). This situation reflects, among others, a mismatch between available and demanded skills in the country, particularly among high and middle-skilled occupations (OECD, 2022[58]).

97. The lack of specialised and skilled workers across sectors is a prevailing concern among Norwegian stakeholders and researchers. Professional competence gaps are identified as a prominent barrier for labour market participation, hindering companies from fully benefitting from digital transformation (KPMG, 2020[36]). According to the Confederation of Norwegian Enterprise's (NHO) Skills Barometer for 2023, 46% of the surveyed companies in Norway have tried to recruit without obtaining the desired expertise[19]. Indeed, Norway's share of IT specialists lags most of its Nordic neighbours, with a worrying 5 percentage point gap between men and women (Figure 22).

Figure 22. Share of ICT specialists

By gender, 2022



Note: See endnotes.[20]
Source: The OECD Going Digital Toolkit, based on European Labour Force Surveys, national labour force surveys and other national sources, https://goingdigital.oecd.org/indicator/40 (accessed on 16 February 2024).

98. As the use of digital technologies in the workplace continues to grow, and technological advancements unfold rapidly, the demand for a workforce adept in ICT-related tasks and in digital-intensive industries intensifies. However, in Norway the share of employees engaged in ICT-related tasks has remained relatively stable over the last decade. In contrast, countries like the Netherlands and Sweden have seen this proportion increase by 7 percentage points over the same period (OECD, 2024[59]). In addition, the share of the labour force employed in high and medium-high digital-intensive industries hovers around 43% in Norway, slightly below the OECD (50%) and Nordic (45%) averages in 2018 (OECD, 2024[60]). This points to a potential area for improvement to align Norway's workforce composition with the evolving demands of a highly digital economy.

99. Recognising that not all workers will adapt quickly to the evolving demands of digital technologies, adequate social protection becomes crucial to successfully match the new needs of businesses with supply. This involves providing displaced workers with active labour market programmes that include job search services and training. In recent years, Norway has performed below the Nordic and OECD averages in this area. Public spending on active labour market programs is notably low, accounting for only 25% of GDP, below the OECD (52%) and Nordic (55%) averages. In particular, public spending on training has fallen significantly in recent years, offering an explanation for the current skill mismatch in the country (OECD, 2024[61]).

Norway's policy landscape related to Jobs

100. Norway has robust labour market policies in general, but it does not have a wide range of major policy initiatives related to the digitalisation of labour markets. The one exception is its initiative "*Overview*

of skills needs in Norway" which was launched in 2023 (Norwegian Ministry of Education, 2023[38]). This initiative recognises the size of the skills challenge, and it offers some constructive initiatives towards tackling it. For example, this initiative focuses on investment in skills provision to working-age adults outside of the labour market, reforms to university funding mechanisms to incentivise lifelong learning and professional retraining, and changes designed to spread skills provision throughout the country, given the concentration of educational institutions in Oslo.

101. While ICT skills in particular are not identified as a specific government priority, the initiative clearly acknowledges the long-term reforms required to the education system to prepare for an increasingly digitalised world facing additional challenges such as an ageing population and the green transition. In addition, the Government has also committed to publishing an additional skills reform specifically targeted at working life, currently expected in the course of 2024, which offers an opportunity to further develop specific policies designed to maximise the benefits and mitigate the disruptive effects of increased levels of digitalisation (Norwegian Ministry of Education, 2023[38]).

102. Despite the positive steps forward taken by Norway in the Jobs dimension, there are still a number of domains which remain underexplored territory. Early consideration of labour market policies to ensure successful and fair transitions of workers between industries and jobs may be warranted, as well as a detailed plan to ensure Norway is able to produce enough advanced ICT specialists to complement its high level of foundational skills. Changing careers can be difficult, and therefore an evaluation of social policies to consider whether those working in jobs most at risk of automation have access to the requisite advice and guidance, including access to tools such as job searches may be beneficial.

103. In addition, notwithstanding Norway's excellent social safety net, consideration of how these protections can be maintained as new models of employment, such as within the platform economy, take hold may be worthwhile. While studies suggest the number of platform economy workers in Norway is currently marginal (Ilsøe and Jesnes, 2020[62]), this growing phenomenon may require a novel policy response.

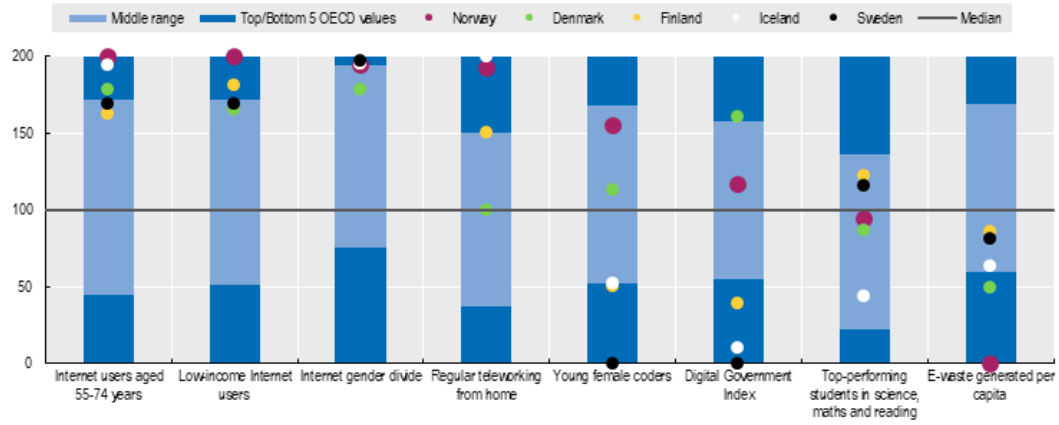
A prosperous and inclusive digital society

104. Societal effects of digital transformation are complex because overall impacts are often not clear-cut, and they do not affect all segments of society equally. Action in the Society dimension helps to ensure every citizen is able to share in the benefits of digitalisation and minimises the number of people who find themselves excluded due to their age, gender, economic circumstances or level of educational attainment. It provides opportunities to enhance access to information via a free and interconnected Internet and improve information integrity. Moreover, it aims to ensure that societal challenges, including those related to providing quality health care, a modern and digital government and ensuring the green transition, are realised.

105. Norway has identified a range of priorities relevant to the Society dimension, including the green transition, digitalising the public sector and promoting digital inclusivity, particularly in the context of an ageing society. It is therefore essential to focus on the Society dimension to achieve Norway's policy ambitions. Overall, Norway excels in this dimension, outperforming both the OECD median value and the Nordic countries (Figure 23).

Figure 23. Norway's performance in the Society dimension

Normalised index of performance relative to the OECD median (index median = 100), 2023 (or latest available)



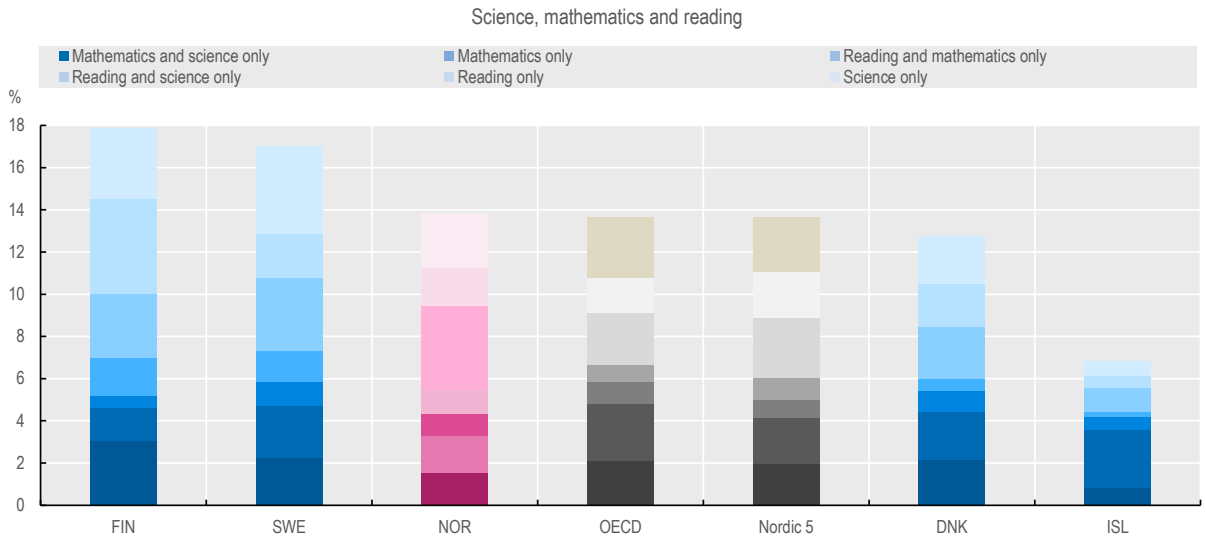
Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]
Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/society (accessed on 7 February 2024).

106. Norway has been successful in addressing societal challenges related to digitalisation. Notably, there has been significant progress in narrowing age disparities in Internet usage since 2018. The elderly population (aged 55-74) has made notable progress in catching up with the overall population's Internet usage. In 2022, the gap between daily Internet usage among the elderly and the wider population (aged 16-74) was only 5 percentage points compared to 9 in 2018 (OECD, 2024[33]). Looking beyond Internet use, the population in Norway is among the most digitally literate across OECD countries, along with other Nordic countries (Iceland and Finland) and the Netherlands.

107. However, recent data suggests a need for improvement to ensure that individuals are well-prepared for the demands of an increasingly digital economy and society. Insights from the OECD Programme for International Student Assessment (PISA) indicate a significant decline in Norway's performance in science, mathematics, and reading, critical skills to thrive in the digital economy. Norway's performance in 2022 marks the lowest scores ever recorded in the survey, with mathematics suffering the highest decline in the short-term (-32.5% from 2018 to 2022) (OECD, 2023[63]).[21] Despite this decline, Norway remains in line with the average across OECD countries, although below the performance of Finland and Sweden (Figure 24).

Figure 24. Top-performing students in science, mathematics and reading, 2022

% of students aged 15-16 years



Note: See endnotes.[22]
Source: The OECD Going Digital Toolkit, based on the OECD Programme for International Student Assessment (PISA) Database (https://oe.cd/pisa), https://goingdigital.oecd.org/indicator/52 (accessed on 12 February 2024).

108. Another concerning trend highlighted by PISA is an increase in educational inequality. The gap in learning outcomes of reading and science between the best and the worst students increased since 2018. The survey also shows a widening gap between the performance of the most advantaged and disadvantaged students in terms of socio-economic status from 2012 to 2022 in Norway, a downward trend not observed in most OECD countries (OECD, 2023[63]).

109. Norway also faces challenges in encouraging students to pursue degrees in ICT and other STEM fields, a critical aspect to succeed in technology-rich work environments. In 2021, the overall number of students graduating in ICT or STEM fields lagged behind all countries for which data is available, except Brazil, despite the Government's special emphasis on ICT-related study programmes since 2015. Data indicates a noticeable gender gap, with only 2% of women graduating in ICT degrees in 2021 compared to 11% of men (Eurostat, 2021[64]). This gender disparity extends to programming skills, with only 21% of women having coding skills compared to 29% of men (OECD, 2024[65]). Norway also lags behind the OECD average in terms of the availability of workers with AI skills, a critical capability in an increasingly digital economy and society (OECD, 2024[66]).

Norway's policy landscape related to Society

110. From a policy perspective, Norway's "Digital Throughout Life" strategy, published in 2021 and supplemented with an accompanying Action Plan in 2023, identifies and seeks to address a range of issues that might lead to digital exclusion (Norwegian Ministry of Digitalisation and Public Governance, 2021[67]; Norwegian Municipal and District Ministry, 2023[68]), The strategy acknowledges that while overall Norway has a highly-skilled population with excellent basic skills and a propensity to use digital technologies regularly, some cohorts such as the elderly, those with health challenges, people of working age not in education or employment, and first-generation non-western migrants (particularly women) tend to be left behind due to their overall level of digital competence. Specific policy measures contained within

the strategy include the expansion of basic digital competence training delivered through local hubs such as libraries, a commitment to designing digital government services so that they are accessible even to those with little or no ICT skills, and information campaigns designed to ensure fundamental concepts such as data protection and cybersecurity are taught in schools.

111. Another important policy domain in the Society dimension is healthcare, an area in which Norway has a strong track record. As highlighted in the assessment of Norway's digital performance in Section 1, Norway is a leader in the sharing of health data and a pioneer in using electronic health records and advanced technologies, like AI, for enhancing innovation in healthcare (Trocin et al., 2022[69]). Last year, the Norwegian Government set out its long-term vision for the future of digital health. While the delivery of healthcare in Norway is devolved among a constellation of different organisations and authorities, the strategy establishes high-level objectives for ensuring digital technologies contribute towards a high-quality, sustainable and innovative health and care sector in Norway, with the hope that these objectives are incorporated into the strategic planning of all organisations in the wider Norwegian health and care ecosystem (Norwegian Directorate of e-health, 2023[70]).

112. Overall, the action taken to date from the Norwegian Government shows a clear focus on the Society dimension, however as the next NDS is developed it is important to ensure that progress in this dimension continues. In addition, while Norway has set itself a clear target of adapting to the climate transition, there is scope for further policy action to assess how digital technologies can assist in meeting this goal.

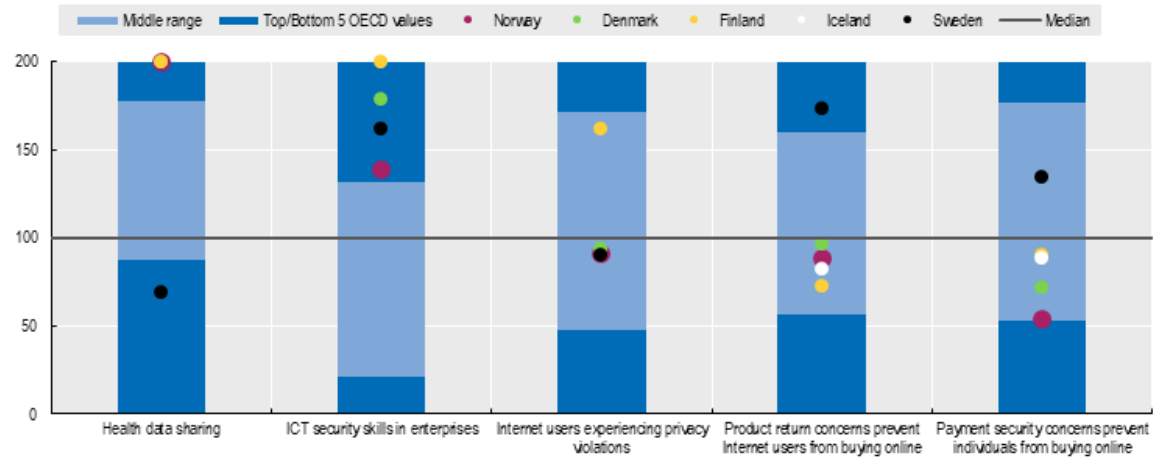
Trust in the digital age

113. Trust is a vital precondition to ensuring the digital ecosystem flourishes effectively. Citizens and businesses must feel safe, secure and empowered as they interact and share data in digital environments if the full potential of data-driven technologies is to be realised. Policies in the Trust dimension help to protect citizens and firms by increasing digital security and protecting user privacy. Given the significant growth in the number of products and services purchased and consumed online, adapting consumer protection laws to ensure they are appropriate for new forms of commerce also forms an important part of this dimension.

114. Achieving success in the Trust dimension is foundational to many of Norway's digital policy priorities. In addition to fostering data protection and information security, developing the data economy, increasing the digitalisation of SMEs, and promoting an inclusive digital society in the context of an ageing population all rely on having adequate protections in place to allow Norwegian citizens to actively participate online with confidence. Research also underscores the strong culture of trust and collaboration among public authorities, businesses and citizens in Norway, with the Government seen as a trusted data steward (Overby and Audestad, 2022[71]) (2024[39]). Norway's performance in the Trust dimension is in the top tier of the best performing OECD countries and is in line with Nordic countries for most indicators (Figure 25).

Figure 25. Norway's performance in the Trust dimension

Normalised index of performance relative to the OECD median (index median = 100), 2022 (or latest available)



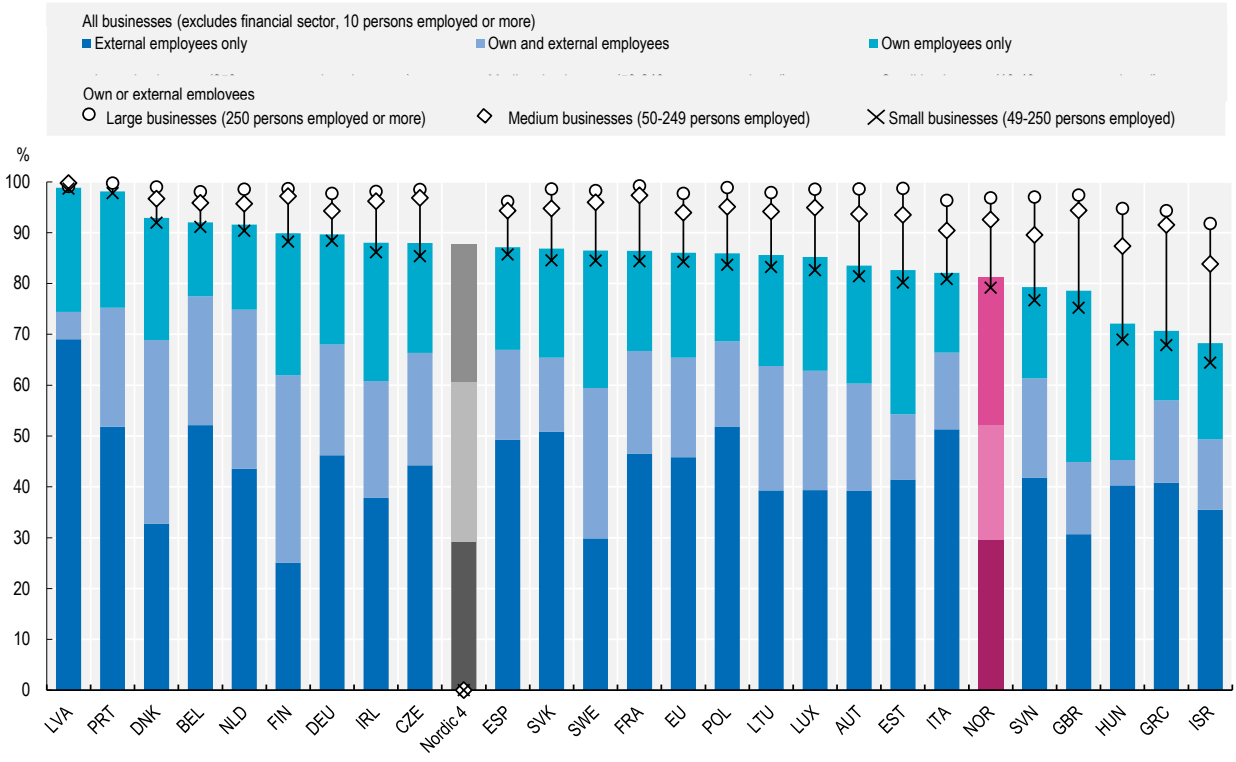
Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]

Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/trust (accessed on 7 February 2024).

115. A survey conducted by the Norwegian Data Protection Authority shows that Norwegians have high levels of trust in how public agencies handle their personal data (Datatilsynet, 2020[72]). 84% of respondents expressed great or at least some trust in the data handling practices of public agencies, particularly in the tax and health sectors. In contrast, only less than 13% reported similar trust in how private enterprises, especially those offering services through social media, messaging platforms, and search engines, managed their data. The survey also revealed that over half of the respondents refrained from using certain services due to uncertainties regarding data handling practices. Moreover, the low incidence of personal information or privacy violations, standing at 3%, significantly contributes to fostering a trustworthy environment in Norway (OECD, 2024[73]).

116. In addition, digital security risk management plays a key role in ensuring a trust. Employees engaged in ICT security-related activities, such as security testing, ICT security training and resolving ICT security incidents, are key drivers of cybersecurity risk management. In Norway, the proportion of firms for which ICT security related activities are conducted in-house (52%) is below the Nordic average (58%), with larger enterprises more likely to integrate cybersecurity risk management skills within the firm than to outsource to other firms (Figure 26). While it is not always efficient to have in-house cybersecurity personnel – for example in the case of small firms – it is important that cybersecurity skills exist within the firm or through external service providers. Small firms in Norway lag their Nordic neighbours and many other OECD countries in this respect.

Figure 26. Share of enterprises in which own employees carry out ICT security related activities



Note: The data refer to enterprises in which own employees carry out ICT security-related activities in the year indicated. See endnotes.[23]
Source: The OECD Going Digital Toolkit, based on the Eurostat Digital Economy and Society Statistics Comprehensive Database, https://goingdigital.oecd.org/indicator/60 (accessed on 16 February 2024).

117. Norway's robust trust culture plays a pivotal role in promoting data sharing across individuals, as well as the private and public sectors (Norwegian Ministry of Local Government and Modernisation, 2021[50]). The country is at the forefront when it comes to understanding the growing importance of data sharing as a basis for the development of the digital economy. Successful data sharing initiatives have already made an impact in various sectors, including banking and agriculture. Endeavours like "AquaCloud" and "Trondheim" underscore the potential to enhance efficiency in industries such as fish farming and maritime (Norwegian Ministry of Local Government and Modernisation, 2021[74]).

Norway's policy landscape related to Trust

118. From a policy perspective, the Trust dimension is dominated by the 2019 National Cyber Security Strategy for Norway (Norwegian Ministry of Justice and Public Security; Norwegian Ministry of Defence, 2019[75]), which is backed by NOK 1.6 billion of investment. Norway's first cybersecurity strategy was published in 2003 and was one of the first national cybersecurity strategies of its kind. The fourth and most recent iteration aims to protect Norwegian citizens and businesses by both expanding national cyber capabilities and building individuals' cybersecurity awareness and skills. It contains more than 50 separate policy measures from establishing a national cybersecurity centre to providing a list of 10 recommendations for companies to follow to improve their cyber hygiene. Overall, it is a comprehensive strategy and serves to cover a significant amount of the domains in the Trust dimension. At the same time, uncertainty related to cyber incidents persists (see Figure 3), highlighting the need to keep focusing on efforts to keep people, firms and the government secure.

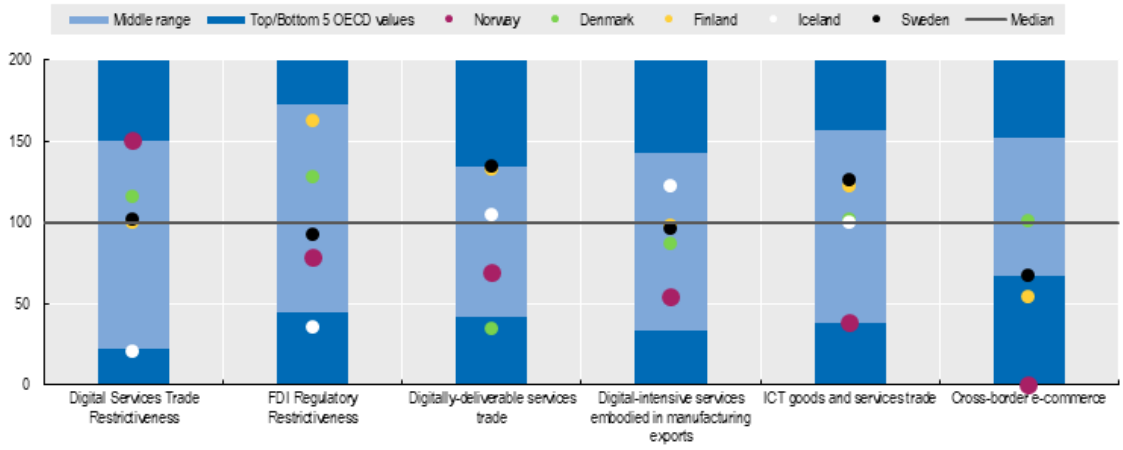
119. Beyond security issues, there are some areas in the Trust dimension where Norway uses European Union (EU) regulation. The most notable of these is the General Data Protection Regulation (GDPR) (European Union, 2016[76]), which Norway follows as a European Economic Area (EEA) country. These regulations are an important standard for placing control of personal data in the hands of individual citizens, and they have been replicated in many jurisdictions. While much of the GDPR is standard for all countries, there are some areas where derogations are allowed, such as with regard to enforcement. In addition, in April 2023 Norway introduced new legislation designed to provide additional protection of consumers of online services (Norwegian Ministry of Justice and Public Security, 2023[77]), based on similar legislation enacted by the EU in 2019 (European Union, 2019[78]).

Market openness in digital business environments

120. Digital technologies transform the way firms interact with each other and their consumers, enabling them to grow by expanding into new markets. They help to open up new frontiers for trade and competition, facilitating the co-ordination of global value chains. Open trade and investment regimes can create new avenues to rapidly upgrade technologies and skills and increase specialisation, as frontier technologies, applications and processes diffuse through open markets. Norway has prioritised developing its data economy, which is related to the Market openness dimension. Overall, Norway's performance in the Market Openness dimension ranks in the lowest tier among OECD countries and falls below the level of other Nordic countries (Figure 27).

Figure 27. Norway's performance in the Market Openness dimension

Normalised index of performance relative to the OECD median (index median = 100), 2022 (or latest available)



Note: Norway's performance is compared to the median value observed in the OECD area, i.e. the middle position among OECD countries for which data are available. See endnotes.[11]

Source: Authors' elaboration based on the OECD Going Digital Toolkit, https://goingdigital.oecd.org/dimension/market-openness (accessed on 7 February 2024).

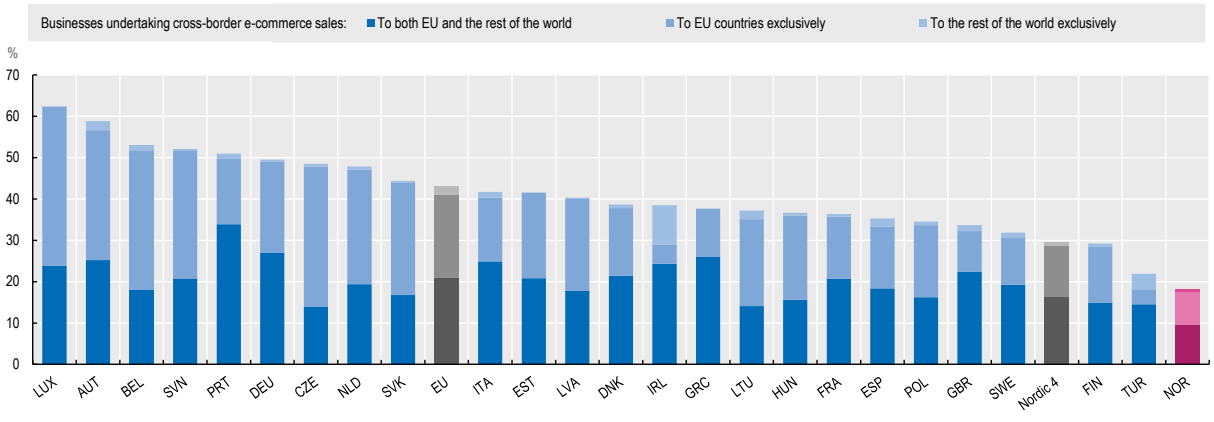
121. Norway exports are heavily reliant on natural resources, with crude oil and natural gas contributing to 73% of total exports of goods in 2022.[24] Only 2% of exports were ICT goods and services, such as computers, communication and consumer electronic equipment in 2022, well below the Nordic average of 8% (OECD, 2024[79]). As Norway's economy continues its transition away from oil and gas, new companies, including those in services industries, are beginning to emerge. Helping these companies to grow from high-potential innovative SMEs to large global exporters requires a dedicated policy response

from improving access to international risk-tolerant and patient capital,[25] to ensuring financial markets and competition enable new market entrants to thrive while still ensuring citizens are protected from any negative impacts.

122. As digital transformation accelerates, e-commerce emerges as a promising avenue for businesses to reach diverse markets. However, cross-border e-commerce sales in Norway have consistently remained among the lowest since 2010, hitting a record low of 18% in 2020 (Figure 28). Digitalisation also increases exports of digitally-deliverable services, but Norway exhibits low shares of such services, representing only 23% of total commercial services trade in 2020, below the OECD (30%) and Nordic (31%) averages (OECD, 2024[80]). This suggests an inward orientation, driven either by explicit trade barriers or other factors. For example, since 2017 there has been a growing concern in Norway regarding payment security online, in contrast to a declining trend observed on average across Nordic and OECD countries (OECD, 2023[81]).

Figure 28. Share of businesses making e-commerce sales that sell across borders, 2020

All businesses (exclude financial sector, 10 persons employed or more)



Note: See endnotes.[26]
Source: The OECD Going Digital Toolkit, based on the Eurostat Digital Economy and Society Statistics Comprehensive Database, https://goingdigital.oecd.org/indicator/72 (accessed on 16 February 2024).

123. Reducing barriers to international investment is also key for advancing digital transformation. Such investments not only allocate resources to more productive uses, but also foster an environment in which firms improve their efficiency. The OECD Foreign Direct Investment Regulatory Restrictiveness Index (FDI RRI) measures statutory restrictions on FDI. Overall, Norway's FDI restrictiveness (0.08) slightly exceeds Nordic (0.07) and OECD averages (0.06). Notable restrictions are observed in the financial services sector (0.07) compared to neighbouring countries like Finland (0.01), and Denmark and Sweden, both of which have no restrictions in this sector (OECD, 2024[82]). This underscores areas in which Norway may consider improving its regulatory environment to attract more international investment to become more digital and innovative.

Norway's policy landscape related to Market Openness

124. Despite Norway not having any dedicated policy initiatives related to Market Openness within its digital policy landscape, Norway has founded Innovation Norway, which aims to improve innovation and digitalisation in Norwegian businesses and help them to expand abroad. Innovation Norway provides financing, training, advice and promotion and networking for businesses in Norway alongside promoting

Norwegian tourism. In 2022, Innovation Norway contributed over NOK 7.1 billion to development and innovation in industry and commerce. Of this, NOK 1.5 billion was allocated to companies less than 3 years old. They have international offices in 23 different countries and work closely with Norwegian consulates to assist Norwegian businesses to access and develop in overseas markets.

125. Market Openness appears to be one of the ripest areas for the development of Norwegian digital policy. Stakeholder feedback characterises the Norwegian economy as traditionally insular and dominated by larger companies in traditional goods-based industries such as fossil fuel and fish (2024[39]). As discussed in the Innovation section, Norway clearly has vast innovative potential, and past success stories such as the ed-tech unicorn Kahoot! have shown what is possible. For companies such as this to continue to grow and thrive, further development of Market Openness policies is essential.

Section 4. Policy recommendations for a more digital, innovative and inclusive Norway

126. Drawing on the research and analysis presented in this report, as well as input from Norwegian ministries, agencies and external stakeholders, this section highlights policy recommendations to achieve a more digital, innovative and inclusive Norway. These recommendations are structured around six areas in which Norway may wish to focus as it designs its next NDS: encouraging digital technology adoption and skills development; prioritising digital innovation; maximising data's potential while maintaining Norway's strong culture of trust; harnessing the potential of digital technologies for society; preparing for next generation networks and a future of unlimited connectivity everywhere; and designing holistic digital policies within effective governance and monitoring mechanisms. These priorities will help to realise the Norwegian Government's vision of a sustainable welfare society that safeguards a safe and simple everyday life for citizens and the NGO sector, a strengthened business sector and a better and renewed public sector.

Encourage technology adoption and skills development to ensure a more digital-intensive economy and resilient workforce

- **Promote the adoption of digital technologies among SMEs**. Norwegian firms are ahead of many other countries in the use of digital technologies including cloud computing, IoT, big data analytics and AI, yet a lack of expertise and risk aversion makes SMEs less likely adopters of these technologies. To boost productivity and facilitate the move to an economy characterised by greater digital intensity, policies aimed at increasing the adoption and effective use of general-purpose digital technologies targeted at SMEs can be helpful. Raising awareness of ICT skills training programs, such as those offered by organisations like Digital Norway, can play a key role in this respect. At the same time, SMEs often lack an awareness about digital business models, something that can be remedied by facilitating SMEs' integration into local knowledge and global skills and innovation networks.
- **Empower people with the right mix of skills to succeed in a digital world of work.** Current skills shortages in Norway mean that focus should be concentrated in areas of high demand (and low supply). The lack of workers equipped with the skills to become ICT specialists and ICT-intensive users starts with the relatively low level of graduates in STEM fields. Norway's performance in foundational skills of the young in mathematics, science and reading has also declined. This calls for specific policies to ensure that people are equipped with the right mix of skills to thrive in a highly digital economy and society, including policies that integrate AI and data-related skills into educational programmes, and promote training for individuals at all skill levels. It is likewise important to ensure that Norwegians are able to transfer such skills as they transition from one job to the next. These efforts should be co-ordinated with private sector needs to avoid

mismatches between available and demanded skills and be accessible to people throughout their education and working lives.

Prioritise innovation to create a more digital Norway

- **Encourage a culture of experimentation and risk-taking.** Digital technologies and data help improve productivity across sectors, but this requires experimentation and risk-taking. Policy experimentation, including agile regulation and regulatory sandboxes, can promote innovation while protecting consumers, even in traditional and established sectors less inclined to experiment. Norway can leverage existing regulatory sandboxes in place, like those in AI and financial services to share learnings and best practices across relevant government agencies. Norway should also review insolvency regimes to ensure risk-taking is not unduly penalised with the aim of increasing entrepreneurship, innovation and productivity.
- **Reduce the regulatory burdens on start-ups and young firms.** Norway should re-evaluate regulations that may not fit the digital age, such as those that require a physical presence or a minimum scale or seek to address information asymmetries. In addition, consideration should be given to the promise of new digital financing solutions, such as peer-to-peer (P2P) lending and platform-based financing, to complement VC and traditional debt and equity financing options for small and young firms.
- **Incentivise VC investment and support firms in scaling up.** Norway has one of the lowest levels of VC investment relative to GDP of any OECD country and small innovations have proven hard to scale up. Measures aimed at increasing the pool of domestic VC funding while also attracting VC investors from abroad can help achieve this objective. Measures such as tax incentives or preferential visas can be useful in this respect.
- **Promote investment in R&D.** Innovation in the digital age relies on a range of inputs from both the public and private sectors, including basic research, R&D, skills, and intangible assets (e.g. patents, organisational capital, data and software). Norway lags its Nordic peers on business R&D expenditure and therefore priority should be given to measures such as tax credits designed to incentivise private sector investment in digitalisation beyond the pilot stage.
- **Harness the potential of "GovTech".** Norway could aim to reintegrate a GovTech function back into its public sector to support the identification and development of innovative solutions to public sector challenges, particularly for areas like AI and the green transition (OECD, forthcoming[83]). In particular, Norway could consider restarting the StartOff programme from the 2025 national budget onwards, potentially focussing it on a digital government priority to maximise its impact and return-on-investment (Norwegian Directorate for Administration and Financial Management (DFØ), 2024[84]). The forthcoming NDS represents an opportunity to consider whether more could be done to help to grow the GovTech ecosystem in Norway.

Maximise data's potential while maintaining Norway's strong culture of trust

- **Leverage Norway's culture of trust to incentivise data sharing.** While Norway has made good progress on data sharing in sectors such as health and banking, there is still untapped potential in other areas, especially in the oil and gas, fisheries and construction sectors. Enhancing access to and sharing of data requires balancing its benefits with the risks, taking into account legitimate private, national, and public interests. The use of contractual agreements, restricted data sharing arrangements and data portability may be helpful in this respect. Engaging stakeholders and fostering collaboration among communities can strengthen trust between companies and contribute to an increased willingness to share data. Communities combining both data users and

holders can facilitate data sharing and help optimise data re-use. However, attention is required to address the risk of anti-competitive effects that could result from data sharing partnerships among (potential) competitors.

- **Realise open government data's potential to drive digital innovation.** The public sector is a large producer and consumer of data, and there is significant potential for governments to use digital technologies and data to innovate. One of the most important things that the public sector can do to drive innovation is to enhance access to public sector data. In particular, Norway could prioritise the systematic use of common standards for information management to support data quality and re-use and implementation of the 'once only' principle (OECD, forthcoming[83]). Norway could also consider collecting official statistics to help measure the impact of data sharing initiatives, including open data, on the Norwegian economy and society (OECD, forthcoming[83]).
- **Take a multifaceted approach to monitoring and addressing cyber risks.** Increase awareness and promote good risk management practices through public and private efforts, especially for SMEs who often lack the capacity to properly protect themselves from cyber incidents. Norway can also assess how uncertainty related to cyber risks is characterised in the country using the GTCU index with a view to tailoring training programs to the types of cyber threats and incidents that create the most uncertainty.
- **Support the development of data-related skills and infrastructure.** The shortage of data-related skills and competences is a critical bottleneck for the effective use as well as the provision of data by Norwegian firms, especially SMEs. Norway may consider implementing initiatives aimed at supporting the development of skills-related initiatives integrated with those that establish data infrastructure. This includes support for the development and provision of statistical and analytical methods and tools.

Harness the potential of digital technologies for society

- **Increase digital inclusion through policies targeted at the groups most in need.** While Norway has much to celebrate about its success in bridging digital divides, there are still opportunities in increase inclusivity. Norway's increasing educational inequality in foundational skills, such as mathematics, science and reading, and the significant gender gap in ICT specialists, point to the need improve the skills mix in Norway. Scaling up specific policy measures outlined in Norway's "Digital Throughout Life" strategy and the related "Action Plan for Increased Inclusion in a Digital Society", such as the implementation of digital literacy programmes through local hubs, can be helpful to achieve this objective, particularly for the elderly. Programmes focused on equipping people with the necessary abilities to navigate digital environments safely, including media literacy skills, are also important.
- **Discourage e-waste production and encourage e-waste recycling**. Norway has placed great importance on preparing for the twin transition, and it has made significant progress in the adoption of zero and low emission technologies. However, stronger incentives could help discourage e-waste generation and encourage e-waste recycling. Expanding the "pay-as-you-throw schemes" to e-waste, in which businesses are charged based on the amount of waste they produce, could encourage e-waste reduction and proper e-waste management practices. Increasing recycling capacity and creating incentives for the use of secondary raw materials, through tax incentives or procurement policies, could also help with the green transition.

Prepare for next generation networks and a future of unlimited connectivity everywhere

- **Upgrade fixed and mobile networks to 5G and beyond.** Norway has excellent 4G connectivity and very good fixed broadband connectivity, but meeting increasing demand requires ongoing investment in fixed networks. Norway's existing connectivity targets recognise the need to upgrade to 5G and FTTH, which will require investments by the Norwegian Government and private sector in broadband to prepare for ever more people, things and technologies going online. Government investment is needed in high-speed fixed and mobile networks or additional incentives for private investment, including by competitive tendering, tax exemptions, low-interest loans or lower spectrum fees, such as in Norway's 2021 spectrum auction.
- **Close geographic connectivity divides by focusing on the underserved.** Expand access in rural and remote places to connect everyone. While rural areas in Norway are increasingly connected to broadband, not all connections are of sufficiently high quality for future connectivity needs such as 8k streaming to multiple devices. Mechanisms like passive infrastructure sharing and co-investment can help expand coverage, depending on local market conditions. Given Norway's unique geography, the Norwegian Government may wish to consider the role that alternative communications technologies, such as satellite broadband and High-Altitude Platforms (HAPs) could play in the wider connectivity ecosystem to connect underserved areas.
- **Foster competition and reduce red tape.** Norway has three mobile operators and a competitive telecommunications market, but market dynamics move quickly. As Norway continues the transition from 4G to 5G, simplifying administrative procedures would facilitate the roll-out of key infrastructures, such as towers, masts and small cells can be helpful.
- **Support businesses improve their connectivity.** Given that most Norwegian businesses do not have the highest speed broadband connections (download speeds of at least 1Gbps), the Norwegian Government may wish to consider policy initiatives designed to incentivise businesses to upgrade their connectivity, such as connection vouchers or information campaigns.

Design holistic digital policies within effective governance and monitoring mechanisms

- **Use the Framework as the basis for designing future digital policies co-ordinated by the forthcoming NDS.** The Norwegian Government should consider how the Framework can be used as a guide to digital policy development going forward. Norway's forthcoming NDS should effectively co-ordinate all major digital policies within Norway's digital policy landscape, ensuring coherence and alignment with future policy developments. Norway should associate dedicated budget to each policy measure in the forthcoming NDS rather than repurpose existing budget to ensure that policy initiatives are properly implemented.
- **Integrate relevant digital policies in the Jobs and Market Openness dimensions into Norway's digital policy landscape.** Norway should consider whether additional policy development is required in these dimensions to achieve a whole-of-government approach to digital policymaking, or whether relevant existing policies could be better integrated into Norway's digital policy landscape including by ensuring that they are co-ordinated with the forthcoming NDS.
- **Foster inter-ministerial co-operation in the field of digital transformation and continue to involve stakeholders in digital policy design and implementation.** Norway should build on the success of its first dedicated digital ministry by ensuring all ministries work together to increase digitalisation throughout the entire Norwegian economy. This will involve combining the domain-specific knowledge of each individual ministry and body under the auspices of the Ministry of

Digitalisation and Public Governance which will deliver clear leadership. Norway has a strong tradition of involving stakeholders in the policy process which it would be well-served to continue.

- **Monitor progress using the Going Digital Toolkit as Norway's national digital dashboard.** The monitoring and evaluation of digital performance in Norway should continue, with the results of this monitoring and evaluation process used to iterate and improve the digital policy landscape to ensure that policy priorities are achieved. The indicators on the Going Digital Toolkit could be used in this context, complemented by more granular indicators for key areas.
- **Strengthen a whole-of-government approach to the adoption of digital technologies in the public sector**. While Norway is a leader in digital governance compared to OECD countries, more can be done to further enhance its digital government maturity. For example, as the government explores the integration of data-driven technologies like AI to enhance public services, Norway could advance its digital maturity by expanding algorithmic transparency initiatives (OECD, forthcoming[83]). This could include the development of an open algorithm register,[27] with comprehensive details about the algorithms utilised across various public sector entities. Such measures would contribute to greater transparency and accountability in the use of digital technologies, thereby optimising the benefits for both the government and the citizens it serves (OECD, forthcoming[83]).

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Annex A. Mapping Norway's major digital policies currently in force[1]

Table A A.1. Norway's digital policy landscape

Name	Description	Dates	Budget	Linked to NDS?	Responsible entities	Dimensions
Meld. St. 28 (2020-2021) Our common digital foundation - Mobile, broadband and internet services	The purpose of this report to the Storting was to present the Government's broad policies on electronic communications, inter alia on topics such as: - Mobile and broadband coverage - Frequency allocations - Security and resilience - Market regulation	2021-	599 000 000 NOK/Dedicated/Annua	Co-ordinated	Ministry of Local Government and Regional Development, Norwegian Communications Authority (Nkom)	Access
Optional coverage obligation - discount in auction price for high-speed broadband in rural areas	In September 2021, the national regulatory authority (Nkom) conducted an auction of spectrum licenses in the 2.6 GHz and 3.6 GHz bands. A discount in auction price was available to bidders that commit to providing broadband services with download capacity of at least 100 Mbps in rural areas. Altibox, Ice, Telia and Telenor all chose to accept this commitment, and will receive a total discount of up to NOK 560 mill., pending on the achievement on fulfilling the coverage obligation. The buildout period is until July 1st. 2015. In this manner, the assignment of the 2.6 GHz and the 3.6 GHz bands was an important step towards the government goal of high-speed broadband being made available to all households and businesses in Norway.	2021-	560 000 000 NOK/ Dedicated/ Multi-year/ 4 years to spend	N	Ministry of Local Government and Regional Development, Norwegian Communications Authority (Nkom)	Access

Security and resilience scheme	The Government supports increased security and resilience in electronic communications networks through an annual grant which is allocated to several purposes: - Agreements with providers regarding resilience measures and equipment. - A reinforced electronic communication programme, establishing at least one area in selected municipalities with reinforced electronic communication services for local crisis management, as well as the rest of the population. This aim is reached by securing backup power for a minimum of three days to base stations and important transmission hubs in designated areas, and in some cases also through establishing an alternative connection to base stations. From 2014 to 2023, reinforced electronic communication has been established, or is under establishment, in more than 90 municipalities spread across the country. New municipalities will be included in 2024. - Measures for strengthening the resilience of electronic communication in vulnerable regions. The aim of the programme is to identify measures that will significantly increase the robustness of the electronic communication in rural areas, by preventing outages of electronic communication services and improving the way outages are managed. The measures follows risk and vulnerability analyses for a specific rural area, can for example be to increase the number of connection routes in the transport networks and strengthen security at key points in electronic communication networks. - Covering costs related to implementation and operation of an emergency alert system based on cell broadcast-technology in the networks of the mobile network providers. In addition to the above-mentioned measures running over multiple years, in the last few years funds from the scheme have been used to - Strengthen the security for telecommunications services on the Norwegian continental shelf, through several measures to increase the security for telecommunication	2006-	188 000 000 NOK/ Dedicated/ Annual	Co-ordinated	Ministry of Local Government and Regional Development, Norwegian Communications Authority (Nkom)	Access

	infrastructure that support the Norwegian oil and gas production. - Strengthen communications to and from Svalbard. - Improve the backup solution for communications at Svalbard. - Support the establishment of a new fiber cable from Norway to Denmark. Upgrade the solution for priority in the mobile providers' networks for users that perform tasks that are critical to the society (from 2G to 4G and 5G and also including data sessions).					
Broadband support scheme	The Government supports broadband rollout in rural areas through a state aid measure, with a yearly grant depending on the parliament's budget decision. For 2024 the allocated amount to the scheme is NOK 400 million (approx. EUR 35 million). The measure has contributed to a high coverage of fast broadband in Norway, currently at approximately 95 pst. for 100 mbps for the country as a whole.	2018-	400 000 000 NOK/ Dedicated/ Annual	Y	Ministry of Local Government and Regional Development, Norwegian Communications Authority (Nkom), regional authorities	Access
Data as a resource - Meld. St. 22 (2020-21). Report to the Storting (white paper).	The purpose of this report to the Storting is to present the Government's policy for value creation using data as a resource. The Government wants Norway to leverage the potential of data to enhance value creation, create new jobs, and to improve public sector efficiency. Better use of data is important if Norway is to succeed in the transition to a more sustainable society and a greener economy. The Government's ambition is to see increased data sharing within the private sector and between the private and public sectors. Data now account for an increasing proportion of value creation in most Norwegian industries and sectors, but the private sector must become even better at using its own data and at sharing data with others. Greater access to and better use of data within the private sector can help start-ups, growth companies and established businesses develop new business models, products and services. This in turn can help make Norwegian business and industry more	2021-	300 000 000 NOK/ Repurposed/ Annual	Y	Ministry of Local Government and Regional Development	Innovation

	competitive, both nationally and internationally.					
Norwegian Data Centers	Strengthen the promotion of Norway as a data centre nation. Make it easier to establish data centres in Norway by publishing a guide in English for foreign actors. Facilitate sustainable development of the data center industry in Norway.	2021-	None	Co-ordinated	Ministry of Local Government and Regional Development	Innovation
Sandbox for responsible artificial intelligence	The main mission for the Data Protection Authority's regulatory sandbox is to stimulate the innovation of responsible AI. The sandbox provides free guidance to a handful of carefully selected companies, of varying types and sizes, across different sectors, in exchange for full openness about the assessments that are made.	2020-	4 000 000 NOK/ Dedicated/ Annual	N	The Norwegian Data Protection Authority	Innovation
The National Strategy for Artificial Intelligence	The strategy should serve as a framework for both public and private entities seeking to develop and use AI. The strategy focuses on specifying what is meant by AI and on describing some areas where it will be important for Norway to exploit the opportunities offered by AI. AI is an area that is constantly evolving. For this reason, no specific time period is applied to the strategy. There will be a need to adjust and evaluate the strategy at appropriate intervals, in line with technological and social developments.	2020-	None	Y	Ministry of Local Government and Regional Development	Innovation

An innovative public sector - Culture, leadership and competence. Meld. St. 30 (2019-2020). White paper to the Storting.	The White paper on Innovation in public sector (2019-20) addresses important features of the development in this field, present situation, need for change and government policy to foster innovation in public sector. The Government's goal is an efficient public sector that provides good services for its citizens, enjoys a high level of trust in the population and finds new solutions to societal challenges in cooperation with citizens, business and industry, research environments and civil society. To achieve this goal, the Government has developed three principles to foster public sector innovation: – Politicians and public authorities need to grant freedom of action and provide incentives for innovation. – Leaders must develop a culture of and competence in innovation, where people have the courage to think differently and learn from mistakes and successes. – Public agencies must seek new forms of collaboration.	2021-	10 000 000 NOK/ Repurposed/ Annual	Y	Ministry of Local Government and Regional Development	Use, Society
Meld. St. 5 (2022 – 2023) Report to the Storting (white paper) Long-term plan for research and higher education 2023–2032	The long-term plan sets objectives and priority areas with a ten-year perspective and contains more concrete goals for the efforts in the current four-year plan period. The first long-term plan for research and higher education was put forward in 2014 (Meld. St. 7 (2014–2015)). The plan is revised every four years, and since introduction it has been revised two times, in 2018 and 2022. The current plan has been adopted by the parliament and will apply for the period 2023-2032. Missions has been launched in the current long-term plan as new instrument in the Norwegian research and innovation policy. The first two missions are on sustainable feed and inclusion of more children and young people in education, employment and society.	2023-2032	None	Co-ordinated	Ministry of Education and Research	Innovation
The Financial Supervisory Authority of Norway's regulatory sandbox	In the regulatory sandbox, fintech firms are given the opportunity to launch new, innovative products, technologies and services while being followed up by Finanstilsynet. Among other things, the firms will learn which permissions are required. The purpose of the sandbox is to: - Help innovative businesses gain increased knowledge about the relevant regulations. - Help raise Finanstilsynet's understanding of new technological solutions in the financial market. - Enable technological innovation and open up for new players.	2018-	None	N	The Financial Supervisory Authority of Norway	Innovation

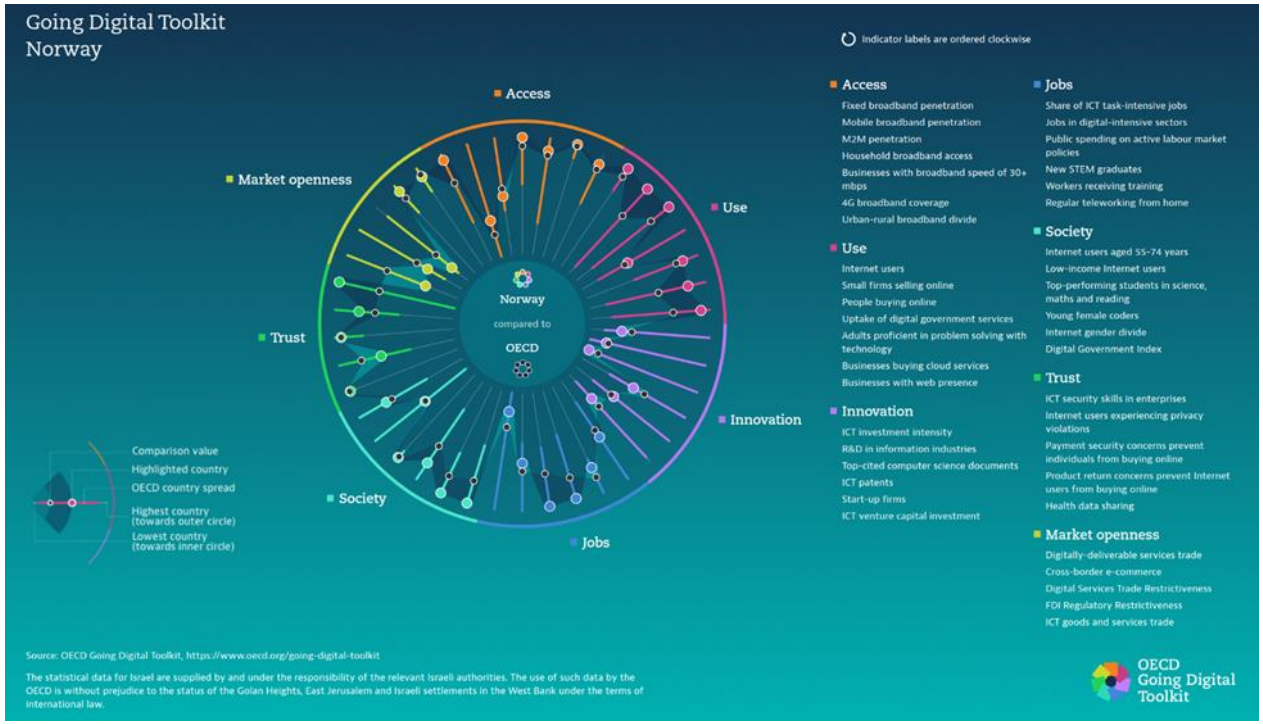
National Strategy for eHealth	The national e-health strategy is the health and care sector's joint strategy for digitalisation and should contribute to common overall priorities and increased execution ability in the e-health sector in Norway. It should be in line with political guidelines and provide direction for the actors' own strategies and plans in the area of digitalisation. The strategy points out a long-term direction at the same time as it should be adapted to experience and changes in circumstances. A vision has been defined that sets the overall direction for what we are going to achieve with the digitalisation work in the health and care sector. Furthermore, it defines three overarching goals that clarify which effects digitalisation, and this strategy, will contribute to: - Quality and coherence of the services - A sustainable health and care sector - Power to innovate	2023-	None	Y	Norwegian Ministry of Health and Care Services, The Directorate of e-health	Innovation, Society
National Cyber Security Strategy for Norway	This strategy is intended to address the challenges that will inevitably arise in conjunction with the rapid and far-reaching digitalisation of Norwegian society.	2019-	1 600 000 000 NOK/ Repurposed/ Multi-year/ 4 years to spend	Y	Ministry of Justice and Public Security, Ministry of Defence	Trust
One digital public sector. Digital strategy for the public sector 2019-2025.	The strategy defines the common goals and focus areas for digitalisation activities towards 2025 and will support digital transformation throughout the entire public sector. Goals/focus areas: - Seamless services and user-centric focus. - Increased data sharing and value creation. - Clear and digitalisation friendly regulations. - A common ecosystem for national digital collaboration. - Governance and coordination for a more seamless public sector. - Enhanced co-operation with the public sector. - Increased digital competence in the public sector.-	2019-2025	1 000 000 000 NOK/ Repurposed/ Annual	Y	Ministry of Local Government and Regional Development	Use, Society
Digital throughout life. National strategy to improve digital participation and competence in the population.	The purpose of this strategy is to prevent digital exclusion in Norway. A linked document, the “Action plan for increased inclusion in a digital society”, is also relevant (but only in Norwegian): https://www.regjeringen.no/no/dokumenter/handlingsplan-for-auka-inkludering-i-eit-digitalt-samfunn/id2984233/.	2021-	15 000 000 NOK/ Repurposed/ Annual	Y	Ministry of Local Government and Regional Development	Use, Society, Jobs

Meld. St. 14 (2022–2023) Report to the Storting (white paper) Overview of skills needs in Norway	The White Paper on skill needs in Norway addresses a structural shortage of labor and unmet demand for several central and critical competences, and the necessity to prioritise in education and skills policy. In the white paper, the Government presents its following priorities: (1) competence that is necessary for a highly productive and competitive business life, (2) competence that is necessary to carry out the green shift, (3) competence that is necessary to have good welfare services throughout the country and to handle the demographic development, balanced against the need for labor in other sectors of society, and (4) to qualify and mobilize more of those outside the workforce. The White Paper consists of 48 measures.	2023-	None	N	Ministry of Education and Research	Use, Society, Jobs

Notes: Norway's national digital strategy "Digital Agenda for Norway" is excluded given it will be replaced by a new strategy that is currently under development. Policies developed under the auspices of the Norwegian Ministry of Local Government and Regional Development now fall under the responsibility of the Norwegian Ministry for Digitalisation and Public Governance.
Source: OECD 2024 DEO Questionnaire and the Norwegian government.

Annex B. Indicator overview for Norway

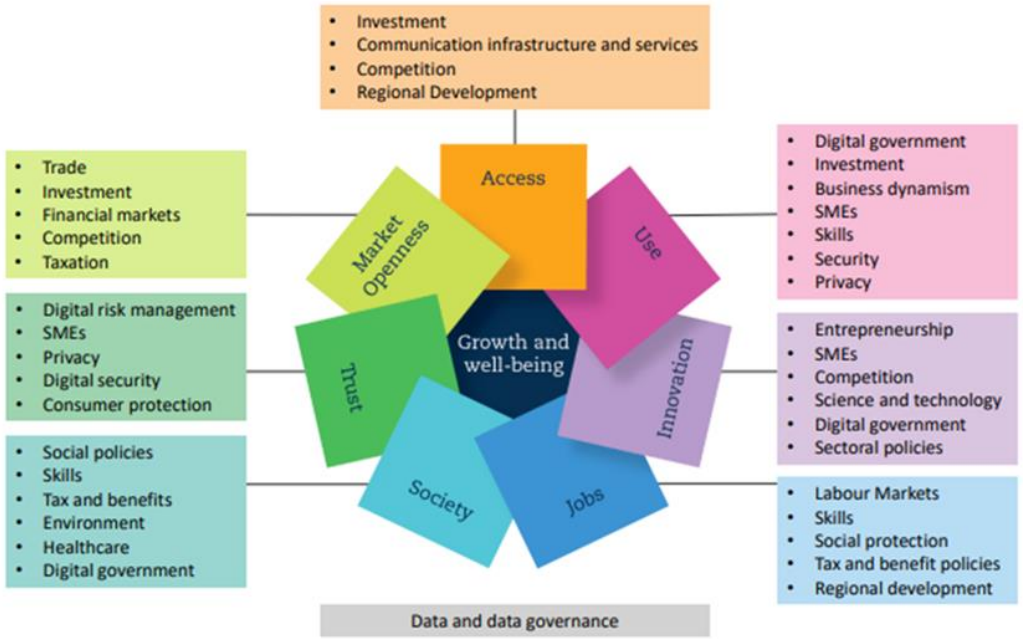
Figure A B.1. Indicator overview for Norway



Source: OECD Going Digital Toolkit, https://goingdigital.oecd.org/countries/nor (accessed on 21 February 2024).

Annex C. Mapping policy domains to the Framework

Figure A C.1. Concordance between the dimensions and policy domains of the Framework



Note: Gender policies are considered in social policies under the Society dimension.
Source: (Gierten and Lesher, 2022[20]).

Endnotes

[1] Mobile broadband penetration includes subscriptions to mobile-broadband networks that provide download speeds of at least 256 Kbps (e.g. using WCDMA, HSPA, CDMA2000 1x EV-DO, WiMAX IEEE 802.16e and LTE), and excludes subscriptions using only GPRS, EDGE or CDMA 1xRTT networks. The data reflect the number of active handset-based and computer-based (USB/dongles) mobile broadband subscriptions to the public Internet, due either to including a recurring subscription fee for data/Internet access or the subscriber having accessed the Internet in the last three months. Broadband subscription penetration rates do not provide information about the prices that users pay, realised connection speeds or whether there are restrictive data caps. Countries performing well in one measure may be weaker in another. Mobile broadband subscriptions data are provided to the OECD by communications regulators that collect them directly from network operators according to common definitions. The OECD average is based on a simple average of all available Member states. Similarly, the Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

[2] National health datasets surveyed by the OECD contain personal data on hospital and mental hospital in-patients; emergency health care, primary care, and formal log-term care data; prescription medicines data; cancer, diabetes, and cardiovascular disease registry data; and mortality data. Not all countries have national health datasets covering each of these areas. Domestic stakeholders include healthcare providers; the government; universities and non-profit research centres; and for-profit businesses. International stakeholders include foreign governments, universities and non-profit research centres. A summary of the results of the OECD Questionnaire on Health Data Development and Governance can be found in: Oderkirk, J. (2021), "Survey results: National health data infrastructure and governance", OECD Health Working Papers, No. 127, OECD Publishing, Paris, https://doi.org/10.1787/55d24b5d-en.% allowing some sharing refers to the share of datasets present in each country which allow sharing with at least one of the above stakeholders. Maximum (100%) sharing potential is achieved when all of the national health datasets present in a country are shared with all of the above stakeholders. A % of sharing potential of less than 100% indicates that one or more of the health datasets present in the country does not allow sharing with one or more of the above stakeholders. A % of sharing potential of 0 indicates that no sharing of the health datasets present is permitted. Sharing does not necessarily imply fully open access to a dataset; sharing is usually subject to privacy protections such as de-identification and stakeholders must apply and be approved to access a dataset. The Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[3] The figure chart comprises two distinct elements: the primary line represents the index itself, quantifying the level of uncertainty associated with cyber incidents in Norway. The secondary line depicts the trend component, derived from seasonal decomposition, which effectively isolates and highlights the underlying long-term trends in the index data.

[4] The total number of major policy initiatives differs from the numbers indicated by the black line because some policy initiatives are relevant to more than one dimension as they contain specific measures that relate to domains that cut across various framework dimensions. As a result, some policy initiatives are included more than once. A full breakdown of the policy initiatives considered and how they were mapped to the Framework dimensions can be found in Annex A.C.1. For panels A-C, the Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). For Panel D, the Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[5] More information available at: https://www.ssb.no/transport-og-reiseliv/landtransport/statistikk/bilparken/artikler/fire-av-fem-nye-biler-i-2022-var-elbiler. Accessed on 4 March 2024.

[6] E-waste refers to all items of electrical and electronic equipment that have been discarded as waste without the intent of re-use. It includes cooling and freezing equipment, screens and monitors, lamps, large equipment (e.g. washing machines and solar panels), small equipment (e.g. vacuum cleaners, microwaves and electronic toys), and small IT and telecommunications equipment (e.g. mobile phones, personal computers and printers). The Global E-Waste Monitor estimates stocks of e-products for each country and the amounts being discarded in each year. Due to a lack of direct data on sales of e-products, new additions to the stock are estimated based on imports less exports. Domestic production is also included for EU countries and Norway. Recycling and reuse figures are provided to Eurostat by national authorities, under the Waste Electrical and Electronic Equipment (WEEE) directive, based on surveys and administrative data from waste collectors and treatment facilities. The Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

[7] For "Visiting or interacting with public authorities' websites" and "Downloading official forms", data refer to 2023 except for Canada, Colombia and Mexico (2022), Iceland and the United States (2021), and Israel and the United Kingdom (2020). For "Sending filled forms via public authorities' websites", data refer to 2023 for Switzerland, to 2022 for Canada and Mexico, to 2020 for the United Kingdom and to 2021 for the other countries. For Israel, data refer to individuals aged 20 and over instead of 16-74. For “Visiting or interacting with public authorities’ websites”, in the Social Survey 2020, the question was asked without time limit: “Do you use the sites of government bodies, ministries, the National Insurance Institute, etc.?”. For “Downloading official forms”, data relate to the following question: “In the past twelve months, did you make use of online forms, such as filling them out online, downloading them or sending them on government websites?”. For Mexico, for “Visiting or interacting with public authorities’ websites”, the following categories are considered: “communicate with the government”, “consult government information”, “download government formats”, “fill out or send government forms”, “perform government procedures” and “comment on government consultations”. For the United States for "Visiting or interacting with public authorities' websites”, the CPS Supplement uses the previous six months as the reference period. The Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

[8] Digital intensity is defined according to the taxonomy described in: Calvino, F., C. Criscuolo, L. Marcolin and M. Squicciarini (2018), “A taxonomy of digital intensive sectors”, OECD Science, Technology and Industry Working Papers, No. 2018/14, OECD Publishing, Paris, https://doi.org/10.1787/f404736a-en. High digital-intensive sectors include (ISIC Rev.4 Divisions): Transport equipment (29 to 30); Telecommunications (61); IT and other information services (62 to 63); Financial and insurance activities (64 to 66); Professional, scientific and technical activities; administrative and support service activities (69 to 82); and other service activities (94 to 96). Medium-high digital-intensive sectors include (ISIC Rev.4 Divisions): Wood and paper products; printing (16 to 18); Machinery and equipment (26 to 28); Furniture, other manufacturing, repair and installation of machinery and equipment (31 to 33); Wholesale and retail trade, repair of motor vehicles and motorcycles (45 to 47); Publishing, audiovisual and broadcasting activities (58 to 60); Public administration and defence; compulsory social security (84); and Arts, entertainment and recreation (90 to 93). Medium-low digital-intensive sectors include (ISIC Rev.4 Divisions): Textiles, wearing apparel, leather and related products (13 to 15); Chemical, rubber, plastics, fuel products and other non-metallic mineral products (19 to 23); Basic metals and fabricated metal products, except machinery and equipment (24 to 25); Education (85); and Human health and social work activities (86 to 88). Low digital-intensive sectors include (ISIC Rev.4 Divisions): Agriculture, hunting, forestry and fishing (01 to 03); Mining and quarrying (05 to 09); Food products, beverages and tobacco (10 to 12); Electricity, gas and water supply, sewerage, waste management and remediation activities (35 to 39); Construction (41 to 43); Transportation and storage (49 to 53); Accommodation and food service activities (55 to 56); and Real estate activities (68).

[9] For visualisation purposes, the contributions of any sectors that acted as a drag on economic growth in the period analysed are plotted below the x-axis (i.e. in negative space) to indicate that their contribution was contractionary. In contrast, any sectors that contributed positively to value added growth are plotted above the x-axis (i.e. in positive space), including in cases where value-added growth in the country was negative overall. Digital intensity is defined in Endnote 8. Data for Germany, Latvia, Lithuania, Norway, Portugal and Switzerland relate to 2017.

[10] The ICT sector is defined as the following three divisions of the 2-digit ISIC Rev.4 industry classification: Computer, electronic and optical products (D26), Telecommunications (D61), Information technology and other information services (D62-63/D62T63). The OECD average is calculated based on 27 countries: Austria, Belgium, Canada, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Mexico, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[11] For 4G broadband coverage, because there are nine countries with maximum values, the top 5 are all 200. Consequently, no top tier area is visible in the figure. All indicators are standardized into indices and presented on a common scale ranging from 0 to 200, where 0 represents the lowest OECD value, 100 denotes the median value, and 200 signifies the highest value. This standardization ensures comparability across indicators, facilitated by established methodology (OECD, 2014[85]). Benchmark charts further elucidate the distribution by highlighting the positions and spread of the top five and bottom five OECD values. When data are not available, the country's relative position does not figure on the graph. Given X_t^c the indicator for country c at time t, and X_t^{Max}, X_t^{Med}, X_t^{cMin}, the respective OECD maximum, median, and minimum values for this indicator, the country index I_t^c is calculated as follows:

$$If\ X_t^c > X_t^{Med}\ then\ I_t^c = 100 + (X_t^c - X_t^{Med}) / (X_t^{Max} - X_t^{Med}) * 100$$

$$If\ X_t^c < X_t^{Med}\ then\ I_t^c = 100 - (X_t^c - X_t^{Med}) / (X_t^{Min} - X_t^{Med}) * 100$$

[12] For Brazil, broadband is defined by type of connection rather than download speed, including DSL, cable modem, fibre, radio, satellite, and 3G/4G. For Colombia, data refer to the business' main Internet connection. The data refer to businesses business uptake of fixed broadband in the year indicated, although some countries may use different periods and the period may vary over time. The OECD ICT Access and Usage by Businesses Database includes data from Eurostat. In 2020, Eurostat changed the way this survey question is asked which may impact the survey responses. The Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[13] M2M SIM cards refers to SIM-cards that are sold specifically for use in machines and devices (e.g., smart meters, and surveillance cameras) and are not part of a consumer subscription.

[14] Data relate to 2023, except for IoT (2021). Data refer to "data analytics" instead of "big data analytics" for the Nordic 4 countries. For all panels, the Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[15] Norway's current NDS is the "Digital Agenda for Norway" strategy. For the NDSC (heatmap), a darker colour indicates greater comprehensiveness in relation to the Framework. The total number of major policy initiatives differs from the numbers indicated by the black line because some policy initiatives are relevant to more than one dimension as they contain specific measures that relate to domains that cut across various framework dimensions. As a result, some policy initiatives are included more than once. A full breakdown of the policy initiatives considered and how they were mapped to the Framework dimensions can be found in Figure A.C.1. The Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[16] The Scimago Journal Rank indicator is used to rank documents with identical numbers of citations within each class. This measure is a proxy indicator of research excellence. Estimates are based on fractional counts of documents by authors affiliated to institutions in each economy. Documents published in

multidisciplinary/generic journals are allocated on a fractional basis to the ASJC codes of citing and cited papers. The field Computer Science comprises the following sub-fields: Artificial Intelligence, Computational Theory and Mathematics, Computer Graphics and Computer-Aided Design, Computer Networks and Communications, Computer Science Applications, Computer Vision and Pattern Recognition, Hardware and Architecture, Human-Computer Interaction, Information Systems, Signal Processing and Software.

[17] Information industries combines the OECD definitions of the "ICT sector" and the "content and media sector" (OECD Handbook on Measuring the Information Society 2011). While this definition includes detailed (three- and four-digit) ISIC Rev.4 industrial activities, in this analysis it is approximated by the following ISIC Rev.4 (two-digit) Divisions, due to limited data availability: "Computer, electronic and optical products" (26), "Publishing, audiovisual, and broadcasting activities" (58 to 60), "Telecommunications" (61), and "IT and other information services" (62 to 63).

[18] More information available at https://www.ssb.no/en/arbeid-og-lonn/sysselsetting/statistikk/arbeidskraftundersokelsen.

[19] More information available at https://www.nho.no/publikasjoner/?c=nho-kompetanse-og-utdanning&c=nho-kompetansebarometer.

[20] ICT specialist occupations are identified by three-digit classes of the 2008 revision of the International Standard Classification of Occupations (ISCO-08): Information and communications technology service managers (133), Electrotechnology engineers (215), Software and applications developers and analysts (251), Database and network professionals (252), Information and communications technology operations and user support (351), Telecommunications and broadcasting technicians (352) and Electronics and telecommunications installers and repairers (742). The Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

[21] Norway's performance is in line with the average for OECD countries. There was a record drop in performance in mathematics, reading and science.

[22] Top performers in science, mathematics and reading are students aged 15-16 years who achieved the highest level of proficiency (i.e. Levels 5 and 6) on the OECD PISA assessment. The Nordic 5 is a simple average of the values from the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden).

[23] Small firms are defined as enterprises that have between 10 and 49 employees, medium firms as enterprises with between 50 and 249 employees, SMEs as enterprises with between 10 and 249 employees, and large firms as enterprises with 250 or more employees. For Canada, medium-sized enterprises have 50-299 employees and large have 300 or more employees. For Japan, data refer to enterprises with 100 or more employees instead of 10 or more. Medium-sized firms have 100-299 employees and large firms have 300 or more employees. The Nordic 4 is a simple average of the values from Denmark, Finland, Norway and Sweden.

[24] Information available at: https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/.

[25] Risk-tolerant and patient capital refers to investments by investors who are willing to fund riskier business models with short-term returns that are not guaranteed.

[26] An e-commerce transaction is the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organisations (OECD, 2011[86]). E-commerce sales (orders received over computer networks) include orders for goods or services placed via a website or

apps and sales made via Electronic Data Interchange (EDI) type messages, but do not include sales via manually typed e-mail orders. For Mexico, data refer to businesses receiving orders via the Internet, instead of over computer networks. The data refer to businesses making e-commerce sales that also sell across borders in the year indicated, although some countries may use different periods and the period may vary over time.

[27] Examples include the Netherlands' Algorithm Register and Canada's Algorithmic Impact Assessment tool (OECD, forthcoming[83]).