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BUILDING BETTER SOCIETIES THROUGH DIGITAL POLICY

BACKGROUND PAPER FOR THE CDEP MINISTERIAL MEETING

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Foreword

This paper examines three key challenges policy makers face in the pursuit of building better societies through digital policy: bridging digital divides, combatting harmful content online and effectively harnessing digital technologies to fight climate change and other environmental problems. This report provides insights into key trends across OECD and partner economies and offers policy actions that can help decision makers tackle these three critical challenges.

The paper provides background to support the discussions on Theme 2: Building better societies through digital policy of the Ministerial meeting of the Committee on Digital Economy Policy, taking place on 14-15 December 2022 in Gran Canaria, Spain. It informs the sessions on "Combatting misinformation and disinformation online", "The future of connectivity – investing in high quality networks", "Advancing inclusive digital societies – bridging digital divides and breaking down barriers" and "Digital technologies in the green transition: Friend or foe?" of the Ministerial meeting.

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Executive summary

Policy makers around the globe face complex challenges as they seek to make societies more equitable, connected, cohesive and sustainable. In the context of digital transformation, three challenges stand out:

- **Bridging digital divides.** Connectivity divides between rural and urban areas, and in skill levels and digital adoption between population groups (e.g. by gender, age, or income) can hamper the participation of all members of society and perpetuate existing inequalities.
- **Combatting the effects of harmful content online.** These include misinformation and disinformation, and other "untruths", which polarise communities and threatens democracies around the world.
- **Leveraging digital technologies in the fight against climate change.** Digital technologies offer promising solutions to lessen environmental impacts, but can bring negative consequences if not managed, such as increased energy use and e-waste.

Bridging divides in societies calls for innovative and multidisciplinary approaches to digital policy that recognise the complex relationships between these challenges. Strengthening regulatory frameworks that foster investment in next-generation networks, promote competition and facilitate network deployment are key to connecting the unconnected and providing high-quality networks for all. Bridging connectivity divides helps build better societies, but only if accompanied by the skills to use connected devices. Initiatives to develop in-demand skills, particularly among the elderly, disadvantaged populations, women and girls, low-income and low-education communities, and small and medium-sized firms are needed to democratise digital transformation and ensure equal participation in society. Focus on gender divides means tackling gender stereotypes and removing barriers to girls' and women's participation in the digital space.

As divides are bridged and more people are brought online, the need to address the creation and spread of harmful content becomes urgent. Critical efforts include: digital-literacy initiatives to empower users to identify and disregard false and misleading information; content moderation policies with independent oversight, harnessing people and technology to check online content and facts at scale; and transparency regarding spending on online political advertisements. Improving the evidence base on the scale, subject, and reach of harmful online content – including its impact on social polarisation and well-being – is essential to combatting its harmful effects on society.

Bridging divides and equipping users with the tools to use digital technologies also extends to the green transition. Digital technologies offer opportunities to address climate change and can be important for societies to power green initiatives. Policy makers should exchange good practices in developing and using digital technologies sustainably and efficiently, identify ways digital technologies can encourage greener choices, and develop standardised and holistic measurements of their environmental impacts.

Policy makers should act now to avoid perpetuating today's problems into the future. A measurement agenda must underpin a collective understanding of progress toward building better societies as the foundation of actions to close digital divides, combat harmful content, and move toward more sustainable digital societies.

Building better societies through digital policy: Background paper for the CDEP Ministerial meeting

Introduction

Building better policies for better lives has been driving policy makers across the OECD since its formation. Better policies should positively impact the lives of citizens, and, on a large scale, lead to economic prosperity and better societies for all. In a context of rapid, yet uneven digital transformation, "better" involves bridging social and gender divides to provide equitable access to digital and communication services and infrastructure, and to ensure equal economic opportunities in the face of emerging digital technologies. This includes protecting civic debate and trust in democracy, and promoting a rapid and smooth green transition.

Digital transformation is key to building better societies, with digital technologies and tools playing a critical role in, for example, achieving the United Nations Sustainable Development Goals, or SDGs (United Nations, 2015[1]). Given that the digital transformation journey is long and winding, to help policy makers assess its progress towards building better societies, this paper examines:

- **Closing digital divides and achieving a connected future.** While digital transformation brings opportunities for economic development and productivity gains, these are not evenly distributed. Despite growth in connectivity, approximately 2.9 billion people – more than a third of the world's population – had never used the Internet by 2021, 96% of which were in developing countries (United Nations, 2021[2]). Disparities between urban and rural areas in coverage, use and quality of communication services leave communities unconnected or with poorer-quality access. Digital divides, along with dimensions including gender, age, educational attainment and income level, contribute to limiting access to essential online services or employment opportunities. These divides hamper participation in the economy and society, and perpetuate and reinforce inequalities, which can impact economic growth and productivity. As digital transformation continues, communications networks will be unlikely to meet demands and support essential services in the future (e.g. healthcare, transportation, education) unless considerable investments are made to roll out next-generation networks and avoid creating new divides where technology is unevenly deployed.
- **Combatting harmful online content, including misinformation and disinformation.** The Internet plays an important role in disseminating knowledge and information. However, it is also the main channel by which misinformation, disinformation, and other "untruths" circulate, causing societal polarisation and other detrimental effects. Such content, particularly disinformation and propaganda, is being used as a form of "information warfare" in the Russian Federation's (hereafter "Russia") invasion of Ukraine, shaping public opinion around the world. Misinformation and disinformation also circulated intensively during the COVID-19 pandemic, undermining

government efforts to promote treatments and vaccinate a significant part of their population. While digital technologies have revolutionised communication and self-expression, the proliferation of harmful (but not necessarily illegal) content weakens social cohesion and threatens democracies.

- **Supporting the green transition.** Digital technologies help identify resource savings and efficiency gains, facilitating sustainable production and consumption, and nudging consumers towards greener choices. Digital tools and technologies such as artificial intelligence (AI) can enable firms to increase productivity and offer solutions to environmental challenges. Highly digital-intensive sectors pollute less compared to low digital-intensive ones, and can support more sustainable economies. The environmental sustainability of communication networks is also of increasing concern, with some operators accelerating the transition to fibre with this in mind. However, digital technologies can use considerable energy and other resources, and can cause negative environmental impacts, such as e-waste, that must be measured and mitigated.

This context calls for urgent attention, leadership and action by policy makers. Today's divides, biases and inequalities should not be built into and perpetuated by the technological systems of tomorrow. Like-minded governments, private-sector actors and community leaders must work together to achieve more cohesive, connected, inclusive and sustainable societies for future generations. Underlying this collective action should be a solid evidence base. The OECD can foster the adoption of measurement systems to strengthen digital transformation metrics globally. With leadership, commitment and action, better societies are within reach.

Box 1. OECD policy research and legal instruments on building better digital societies

- *Broadband Networks of the Future* (OECD, 2022[3])
- *Bridging digital divides in G20 countries* (OECD, 2021[4]) and *Promoting high-quality broadband networks in G20 countries* (OECD, 2021[5])
- *The road to 5G networks* (OECD, 2019[6]) and *The operators and their future* (OECD, 2019[7]),
- *Emerging trends in communication market competition* (OECD, 2021[8])
- *Measuring the environmental impacts of AI compute and applications: The AI Footprint* (OECD, 2022[9])
- The Going Digital Measurement Roadmap (OECD, 2022[10])
- OECD Going Digital Toolkit Note on *Disentangling untruths online: Creators, spreaders and how to stop them* (Lesher, Pawelec and Desai, 2022[11])
- OECD Broadband Portal (OECD, 2022[12])
- OECD Going Digital Toolkit (OECD, 2022[13])
- OECD.AI Policy Observatory (OECD, 2022[14])
- 2010 OECD Recommendation on ICT and the Environment (OECD, 2010[15])
- 2019 OECD Recommendation on Artificial Intelligence (OECD, 2019[16])
- 2021 OECD Recommendation on Broadband Connectivity (OECD, 2021[17])

Digital divides: Connectivity, skills and socio-demographics

Connectivity divides

Geographic divides

Substantial disparities persist between urban and rural areas in the use, quality and coverage of broadband connections. Gaps between rural and urban households in the use of basic broadband services (mobile or fixed, of at least 256 Kbps advertised speed) can be seen across OECD countries. In 2021, data from 30 OECD countries showed that urban households were, on average, 4 percentage points more likely than rural households to have subscribed to basic broadband services (OECD, 2022[13]).

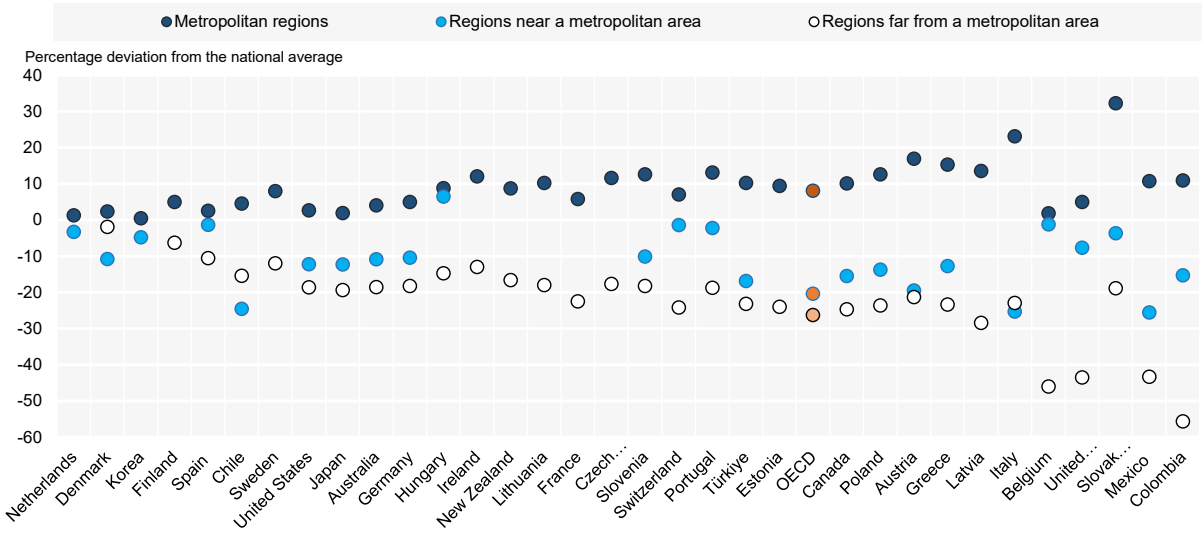
In addition, speeds experienced by rural users are often lower than those by their urban counterparts in the same country. Data for available OECD countries from self-administered connection-speed tests by Ookla show that peak download speeds over fixed networks in regions far from metropolitan areas (rural and/or remote areas) were, on average, 26 percentage points below the national average in the first quarter of 2022, while peak download speeds in metropolitan regions were on average 8 percentage points above the national average (Figure 1). This means that people in metropolitan regions in OECD countries experience on average, fixed broadband download speeds 44.5% higher than in remote regions. While some countries have a narrower gap between regions, a persistent divide remains between urban and rural areas in all OECD countries for which information was available.

Download/upload speeds are only one aspect of broadband quality. Other metrics, such as network latency (the time it takes for information to travel between two points e.g. from when a command is sent and a response is received), network reliability, and quality of experience, also indicate network performance (OECD, 2022[3]). Differences in quality dimensions other than speed also exist between rural and urban areas, which can cause a lower overall quality of experience for rural users.

A gap also exists in the coverage of communication services or the ability to subscribe to a communication offer in a given area, especially of an acceptable quality. In 2021, 67.5% of rural households in Europe were located in areas that were able to contract a fixed broadband subscription with a minimum speed of 30 Mbps, compared to 90.1% of households in overall areas (OECD, forthcoming[18]). Increasing the coverage of communication services such as fixed broadband in remote and low-populated areas can be challenging as there may not be a business case for providing service. Technologies like fixed wireless access (FWA) and satellite broadband have been proposed as possible options to provide communication services in these areas. However, these can come with drawbacks. For example, satellite broadband may come with restrictions in bandwidth (e.g. data caps) or a lower advertised speed, or be of lower quality or at a higher price.

Figure 1. Gaps in fixed download speeds experienced by users, by TL3 (small regions) classification*

Percentage deviation from national averages** (Q1 2022)



Notes: OECD calculations based on Speedtest by Ookla for Q1 2022. Measurements are based on speed tests performed by users around the globe via the Speedtest platform. As such, data may be subject to testing biases (e.g. fast connections being tested more frequently), or to strategic testing by ISPs in specific markets to boost averages. Average is of download peak speed tests experienced, weighted by the number of tests, as the percentage deviation from the national average across 36 OECD countries (data for Costa Rica and Israel unavailable). For a more comprehensive picture of Internet quality and connectivity across places, see OECD (2022[3]), *Broadband networks of the future*.

*This figure is adapted from OECD (forthcoming[19]) *Regions and Cities at a Glance,* based on Ookla's dataset with a TL3 (small regions) classification (see *OECD Regional database,* http://dx.doi.org/10.1787/region-data-en).[1] Within small regions, the OECD has three main classifications: "Metropolitan regions", "Regions near a metropolitan area", and "Regions far from a metropolitan area". Within the last category, two further sub-categories are included: "Regions close to small/medium city" and "Remote regions" (see details in https://doi.org/10.1787/20737009).

**Iceland, Luxembourg and Norway are excluded from the figure as there is only data from one region in these countries. As such, the dispersion from the mean is zero.

Source: Speedtest® by Ookla®Global, *Fixed and Mobile Network Performance Maps*, https://registry.opendata.aws/speedtest-global-performance/.

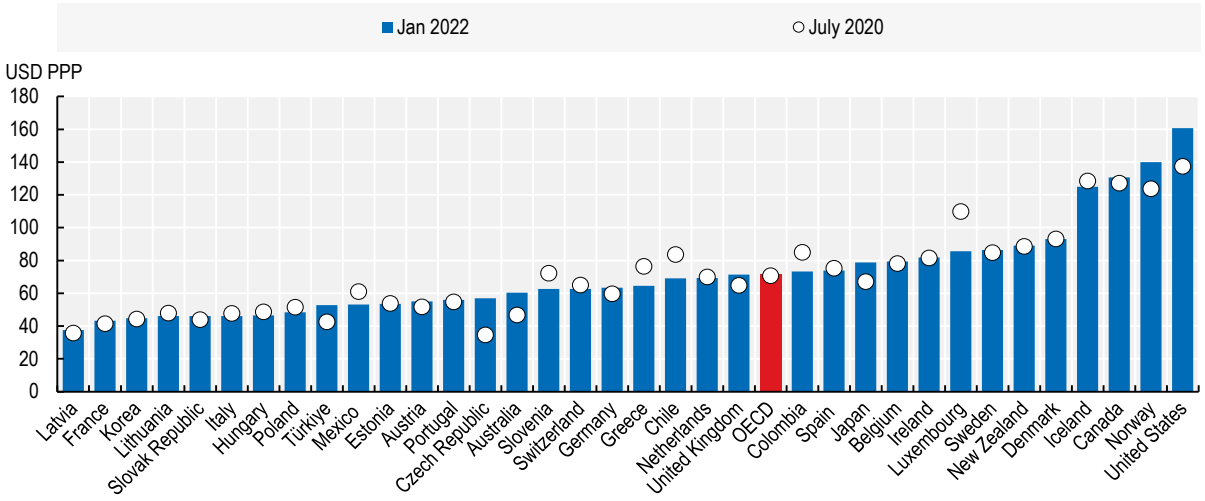
Income divides

Affordable access to communication services leads to their greater adoption and a more inclusive participation in digital transformation. The price of communication services is influenced by national policies and regulatory frameworks and the level of competition in the communication market. According to the new OECD price methodology for bundled communication services, prices of triple-play bundles (fixed broadband, fixed voice and television) have, on average, decreased by around 21% for medium high and medium low usage profiles in the OECD area from July 2020 to January 2022. While a welcome overall development, disparities in broadband bundle prices exist between countries (Figure 2).

In countries where the prices of bundled communication services are high, these services can be unaffordable for parts of the population. Without access to communication services, such groups risk further marginalisation if they cannot access the digital tools necessary for essential services (e.g., education, employment, healthcare, transportation).

Figure 2. Price of bundled communication services, in January 2022

3-play (fixed broadband, fixed voice and TV) basket – Low user profile



Notes: Prices calculation are for the average of the three cheapest offers meeting all criteria for a given user profile. For New Zealand, data refer to July 2021 instead of January 2022. Data for Costa Rica (OECD ascension in May 2021) is not included as the country was not an OECD member until mid-way through the data collection, and data for Israel for this period was unavailable.
Source: OECD calculations based on Telligent/Strategy Analytics, "Telligent tariff & benchmarking market data using the OECD methodology", https://www.strategyanalytics.com/access-services/service-providers/tariffs---mobile-and-fixed.

Inflation risks exacerbating existing income divides. Inflation in OECD countries is expected to exceed 9% in 2022, doubling prior estimates, with 40-year highs reported in Germany, the United Kingdom and the United States (OECD, 2022[20]). Sharp price increases for basic expenses like food and energy have decreased consumers' purchasing power, forcing some households, especially in low-income brackets, to make tough choices to cut spending in other areas (OECD, 2022[20]). This context disproportionately impacts lower-income households as they spend a larger proportion of income on basic needs like food, energy, shelter, transportation and communication services. As the cost of living rises across OECD countries, the affordability of communication services is likely to become even more important to the adoption of connectivity services.

Skill and age divides

Digital technologies change the nature of work, including by facilitating the automation of certain tasks and creating jobs requiring new skills. Such changes spur concerns that technologies, like AI, will replace human workers instead of complementing, assisting, and enhancing their work and productivity.

However, looking at AI in particular, studies do not show an overall decline in employment and wages in occupations exposed to AI, and some even find a positive impact on high-skilled wage growth (Lane and Saint-Martin, 2021[21]). This may nonetheless contribute to workforce inequalities if lower-skilled workers' jobs are more easily automated and they struggle to gain new skills for reemployment. While evidence from the OECD Survey on Adult Skills shows differences in worker exposure to digital technologies across countries and occupations (OECD, 2019[22]), further research is needed to predict what skills will be demanded in various sectors in the future to prevent workers falling behind.

Across the OECD, individuals with lower levels of educational attainment – frequently from low-income households – tend to make less advanced use of the Internet compared to their more highly-educated counterparts (OECD, 2022[23]; OECD, 2019[24]). Instead of using the Internet simply for communication, a

well-rounded skill set allows more diversified and complex Internet use (e.g. e-banking, e-learning, e-health) while taking action to ensure digital security (OECD, 2019[22]).

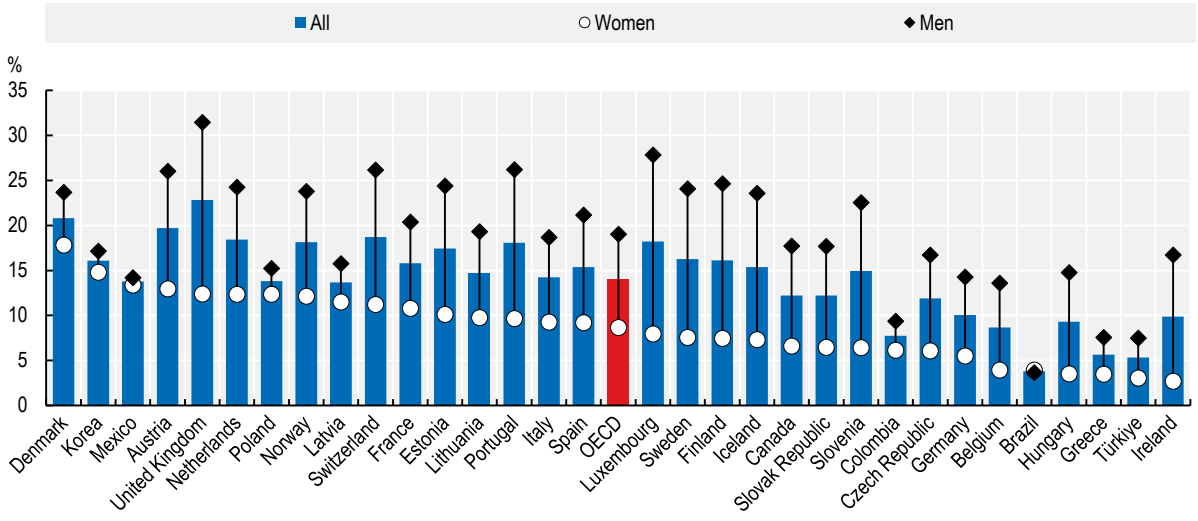
Age also plays a role in the use of digital technologies. For example, in 2021 98% of 16-24-year-olds reported using the Internet, compared to 78% of those aged 55-74 (OECD, 2022[23]). Younger "digital natives" are fluent in the use of digital technologies, but older people can get left behind, putting the elderly at risk of exclusion from services (e.g. healthcare, banking, e-government), which are increasingly reliant on digitalised systems (OECD, 2019[25]).

Gender and ethnic divides

Digital transformation provides new avenues for empowering women and girls, but discrimination, harassment, negative stereotypes, and social and cultural biases create challenges (OECD, 2018[26]). Information and communication technology (ICT) occupations and some online activities largely remain the domain of men, hindering the digital inclusion of women more broadly. Studies show that women in labour markets around the world are paid less, hold fewer positions at senior levels, and participate less in the STEM (science, technology, engineering and mathematics) fields essential for developing digital technologies (UNESCO, OECD, IDB, 2022[27]). Moreover, fewer women than men engage in innovation or entrepreneurship, further limiting their impact on digital transformation (OECD/European Union, 2017[28]). In OECD countries, more than twice as many young men (aged 16-24) than young women can program (Figure 3). A 2021 study of low- and middle-income countries found that women were 16% less likely than men to use mobile Internet and that, while more women began using mobile Internet in 2020-21, the rate slowed, suggesting stalling progress (GSMA, 2022[29]). In AI, women represented only 18% of C-suite leaders among top start-ups globally in 2019 (Best and Modi, 2019[30]), and accounted for only 14% of authors of peer-reviewed articles on AI worldwide in 2020 (OECD.AI Policy Observatory, 2022[31]).

Figure 3. Share of 16-24 year-olds who can program, by gender, 2021

As a percentage of all Internet users



Notes: For Canada and Mexico, data refer to 2020. For Colombia, Ireland and the United Kingdom, data refer to 2019.
Source: The OECD Going Digital Toolkit, based on the OECD ICT Access and Usage by Households and Individuals Database, http://oe.cd/hhind, https://goingdigital.oecd.org/indicator/54.

New technologies, like AI, and the data required to operate or train them may not always be neutral and may perpetuate stereotypes and biases in society. Sometimes, the data used to train AI algorithms is

incomplete and not representative of society. In other instances, even complete datasets might reflect existing social and economic inequalities (UNESCO, OECD, IDB, 2022[27]). These biases can have implications for gender equality. For example, some automatic language translation models have been found to introduce masculine pronouns for occupation titles in gender-neutral sentences, often attaching genders to occupations (e.g. “He is the President”/ “She is a nurse”) (UNESCO, OECD, IDB, 2022[27]). Some speech recognition software has shown to be more accurate with male than female voices (Standards Council Canada, 2020[32]). This potentially poses risks for women when speech recognition is used in applications with a higher possible risk level, such as healthcare or self-driving cars.

Biases embedded in technologies are also observed when it comes to ethnicity. In 2018, analysis of some commercially available facial-recognition systems showed the technology to be more effective in identifying light-skinned and male faces than darker-skinned and female faces (Buolamwini and Gebru, 2018[33]). In many cases, this is caused by using large training datasets that lack representative population samples from diverse groups. This carries a risk of digital technologies serving some groups better than others, further widening social divides. Given such examples, ensuring equal and diverse representation in workplace and leadership positions is important to ensure that technologies being developed are fair and inclusive, and to avoid perpetuating biases and stereotypes. OECD countries can do more to support gender, racial and ethnic diversity in ICT industries by empowering women, girls and minority groups in STEM education and professions through affordable access and skills development.

Policies to advance inclusive societies by bridging digital divides

Expanding connectivity at affordable prices is at the heart of an inclusive society. Promoting competition is one of the strongest policy levers to extend connectivity, lower prices and increase quality, including for underserved populations. Where market forces cannot fulfil all policy objectives, as in rural and remote areas, approaches might include demand aggregation models, coverage obligations in spectrum auctions, subsidies for national and rural broadband networks, alternative connectivity approaches (such as community networks), and specific funds or competitive tenders to foster deployment in rural areas. Universal service policies may also benefit these areas if deployed effectively. Sharing good practice and experience and fostering international co-operation can help countries build capacity to close digital divides. Additionally, the measurement of broadband speed, quality, and coverage across regions is essential to track the evolution of urban-rural access divides. Similarly, measuring differences in usage by region, income, education, gender, and age can help policy makers narrow divides.

Most OECD countries have policies to promote digital uptake and use (OECD, 2020[34]). Common target consumers are vulnerable groups, such as children, students, seniors, low-income households, or people with disabilities. Non-financial support is the most widespread instrument to promote use of digital technologies by households and individuals. Official portals or hubs provide virtual spaces to share experiences, run awareness campaigns and undertake training. Programs addressing privacy concerns are also important to build trust in the digital economy and encourage greater digital participation. In addition, recent large-scale public sector reforms enable digitalised services to better respond to citizens’ needs and reach disadvantaged communities. These platforms allow citizens to access an array of public services online (e.g. education, healthcare, administrative services, etc.), spurring the adoption of digital tools.

To close digital skills divides, all individuals must be empowered with ICT, literacy and numeracy skills, together with socio-emotional skills to be flexible and adapt to change (OECD, 2019[22]). This requires equal opportunities to access the resources, training and skills needed to thrive in the workplace of tomorrow, namely access to quality education, re-skilling and upskilling for the jobs and societies of the future (OECD, 2019[22]). Education programs for citizens, consumers and workers should not focus only on technical skills, but include information on how to seek redress from digital harms and rights violations in the digital environment. Measuring digital skills among different groups, the effectiveness of policy

initiatives and training outcomes is key to overcoming skills gaps and allowing the effective use of digital technologies by all.

While OECD countries have enacted measures to narrow the gender gap, more needs to be done, considering the signs of a widening digital gender divide and the compound effect it can have in the future. Co-ordinated and complementary policy actions can reverse these trends and forge a more inclusive path. Addressing the digital gender divide requires raising awareness and tackling gender stereotypes while enabling enhanced, safer and more affordable access to digital tools, and fostering co-operation among stakeholders to remove barriers to girls' and women's participation in the digital world. This can be achieved by leveraging digital technologies themselves and the opportunities they offer once accessible (OECD, 2018[26]). Public policies promoting STEM careers among women and girls should also be prioritised to close this gap.

As governments work in the present to close digital divides, the future cannot be ignored. To meet the demands of current – and importantly, future – technologies, networks must provide service with increased speed, capacity and reliability, coupled with low response times. Therefore, policy makers must consider today how to encourage appropriate network investment to deploy "future proof" technologies and next generation mobile networks (e.g., 5G, 6G) evenly to avoid creating new divides. Policy makers can promote high-quality broadband connectivity to reach the majority of society by strengthening regulatory frameworks that foster investment in cutting edge technologies and next generation networks and facilitating their deployment.

Misinformation, disinformation and other "untruths" online breed social polarisation and harm societal well-being

The Internet plays a central role in the dissemination of knowledge and information worldwide. However, it has also become a vehicle for harmful, but not necessarily illegal, content disseminated at unprecedented speed, reaching more people more quickly than ever. In parallel, the use of algorithms and AI-based approaches to curate content makes it difficult to track the sources of "untruths" online and even more complicated to monitor their flow or stop their spread.

Harmful online content, including disinformation, propaganda, misinformation, contextual deception, and satire (Box 2), increase social polarisation, undermine trust in democratic institutions, and negatively affect the well-being of society. It is imperative that individuals, firms and governments work together to reduce the negative effects and promote the diffusion of reliable information.

Box 2. What's in a name? A taxonomy of "untruths" online

False, inaccurate, and misleading information take different forms:

- **Disinformation** refers to verifiably false or misleading information that is *knowingly* and intentionally created and shared for economic gain or to deliberately deceive, manipulate or inflict harm. Examples include fake news, synthetic media (including deepfakes) and hoaxes.
- **Misinformation** refers to false or misleading information shared *unknowingly* and not intended to deliberately deceive, manipulate, or inflict harm.
- **Contextual deception** refers to true but irrelevant information used to frame an event, issue or individual (e.g. headline not matching an article), or the misrepresentation of facts to support one's narrative (e.g. deliberate deletion of essential information).
- **Propaganda** refers to activity or content adopted and propagated to manage collective attitudes, values, narratives, and opinions often by governments, but also firms and individuals.
- **Satire** refers to the use of humour and exaggeration to critique people or ideas and is an important form of social and political criticism. However, as content is shared and re-shared, this connection is sometimes lost, leading new viewers to misunderstand the original meaning.

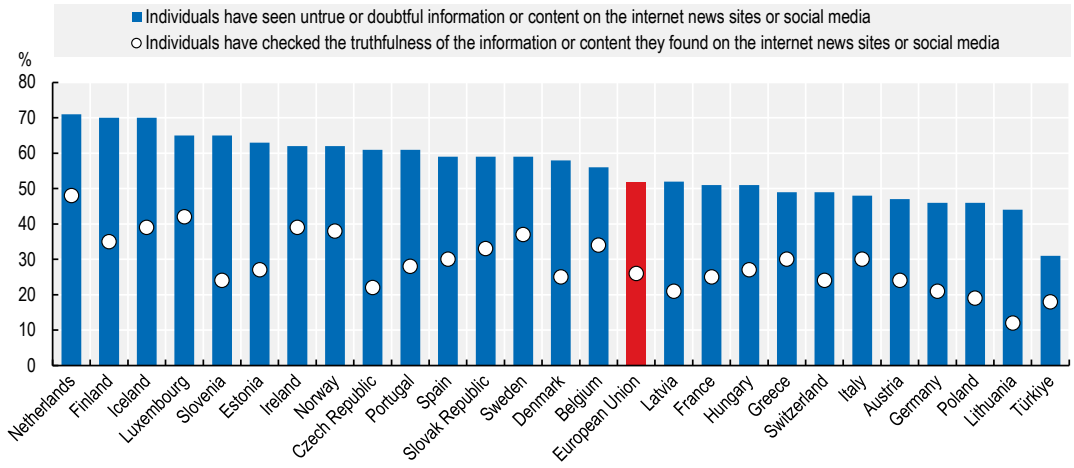
Source: OECD, see (Lesher, Pawelec and Desai, 2022[11]).

False, inaccurate, and misleading information aggravated and complicated many recent crises. During the COVID-19 pandemic (WHO et. al., 2020[35]), misinformation and disinformation hampered government efforts to vaccinate the population and provide reliable information about treatments. Similarly, the circulation of this content undermined democratic processes (OECD, 2022[36]), (Colomina, Margalef and Youngs, 2021[37]). Disinformation campaigns, including from foreign sources, have influenced voter turnout and led to election fraud in some countries (Taylor, 2019[38]). Most recently, propaganda and disinformation are being used as a form of "information warfare" in Russia's large-scale aggression against Ukraine. The OECD highlighted the need for democracies around the world to work together to prevent the spread of disinformation related to this aggression (Matasick, forthcoming[39]).

In parallel, women, particularly those in politics and other leadership positions are increasingly targets of gendered disinformation campaigns. This phenomenon tends to be even more pronounced for female political leaders from ethnic, religious, or other minority groups; for those who are highly visible in the media; and for those who speak out on feminist issues (Di Meco and Brechenmacher, 2020[40]). The practice has a silencing effect on practically half of the world's population, as women are drawn to disengage online, censor themselves and avoid careers in politics and other male-dominated occupations where they are more at risk of being targeted (Sessa, 2022[41]).

Harmful online content is especially problematic because creators are adept at making false and misleading claims appear valid. In 2021, more than half of Europeans report being exposed to untrue or doubtful information or content on Internet news sites or social media (Figure 4), but only 26% checked the veracity of the information or content found online. In this regard, public policies are essential to empower people with tools to identify and handle different types of false and misleading information.

Figure 4. Internet users that report having seen untrue or doubtful information, 2021



Source: Eurostat, Digital Economy and Society Statistics (database), https://ec.europa.eu/eurostat/web/digital-economy-and-society/data/comprehensive-database, July 2022.

While false and misleading online content threatens everyone, younger generations are particularly exposed, as they heavily rely on online sources – primarily social media – for information on current events (UNICEF, 2021[42]). In addition, the OECD's PISA 2018 results show socio-economically disadvantaged students as less likely than students from advantaged socio-economic backgrounds to be able to identify credible sources (Suarez-Alvarez, 2021[43]).

Content creators, users of online platforms, and online platforms themselves have roles to play in stopping the creators and spreaders of "untruths" online, and ensuring transparency and accountability. Designing better policies requires deeper understanding of the dynamics underlying the extent and spread of false and misleading content online. The OECD identified five steps that can mitigate the negative effects of misinformation, disinformation and other "untruths" online, and heighten the protection of fundamental rights (Lesher, Pawelec and Desai, 2022[11]):

- **Promote digital literacy initiatives** to equip people to identify false and misleading information, and disregard or ignore it. Such initiatives, offered by governments, schools, universities, online platforms, and civil society organisations, often focus on cognitive, critical, and technical skills.
- **Develop content moderation policies** in a multi-stakeholder process with independent oversight, involving fact-checking organisations and researchers, and setting up independent audits of content-moderation decisions.
- **Harness the power of people and technology** to fight "untruths" online. Manual fact-checking, content moderation and takedown involve human intervention, but automation of certain functions and development of technologies that embed them by-design are also needed to achieve scale.
- **Increase transparency in spending on online political advertisements** by requiring political parties to disclose money spent towards digital advertisements and online content. This could help people identify politically-driven disinformation and minimise its harms.
- **Design a measurement agenda** to improve the evidence base to shed light on the scale, content and reach of untruths online. This involves looking at who spreads false and misleading information, where it originates, what type of content is spread, and which channels are used to do so.

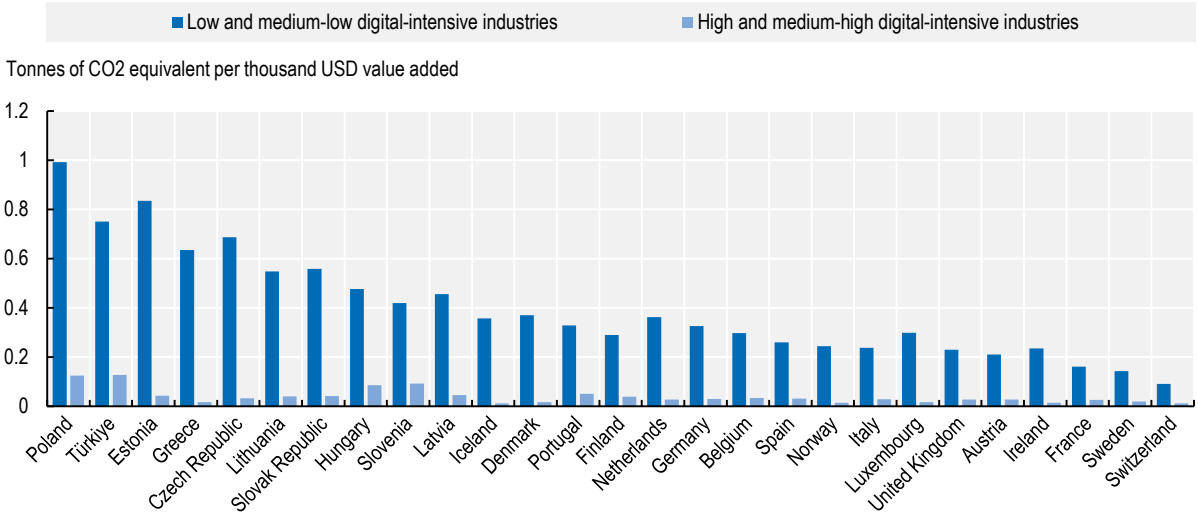
Green transition: Digital technologies as friend or foe?

Climate change is having devastating impacts globally, affecting many communities that have contributed to it the least. Over 70 countries, accounting for 76% of global greenhouse gas (GHG) emissions, committed to reaching net zero emissions by 2050 (United Nations, 2022[44]; UNEP, 2021[45]). Digital technologies can play a key role in reaching this goal by helping optimise resource use, but may also contribute to emissions and other environmental issues by using large amounts of energy and resources. Negative environmental impacts of these technologies will have to be minimised and cleaner ones developed and adopted wherever possible. This duality of digital technologies, recognised in OECD Council Recommendations (OECD, 2019[16]; OECD, 2021[17]), presents a challenge for policy makers, particularly for countries early in the process of digital transformation.

Digital technologies and connectivity enable tools that can assist in the green transition. AI-enabled digital twins,[2] smart sensors, and other digital devices can optimise energy management and consumption, and identify ways to make cities and infrastructure more resilient to a warming climate. Virtual meeting platforms can negate the need for travel (and its environmental impacts). Internet-of-Things (IoT) technologies can remedy software-related product defects remotely in some cases, avoiding e-waste where products would otherwise need replacement. Digital tools can also be used to nudge[3] consumers towards greener choices (Sunstein, 2014[46]), from reducing energy consumption (Rivers, 2018[47]; OECD, 2017[48]) to more sustainable online shopping (Michels, 2022[49]; Sanchayan, 2022[50]). These include data and notifications about energy and other consumption, and proposing options for more sustainable alternatives for online purchases. Such digital nudges have the potential to play a significant role in the green transition given that household spending accounts for around 60% of GDP across the OECD (OECD, 2022[51]).

Despite these positive impacts, digital technologies have an environmental footprint, especially in low-digital-intensive[4] sectors (Figure 5). While digital technologies such as AI and IoT can enable efficiency and more sustainable consumer choices, they also require computing and other resources along their lifecycle, which can use large amounts of energy, water, and other natural resources, and emit GHGs (UNEP, 2021[52]). The training and use of large-scale AI systems require massive amounts of computing resources, with significant environmental footprints (OECD, 2022[9]). In addition, a lack of repairs and software support for older digital products, coupled with low collection and recycling rates leads to high rates of e-waste. Production of ICT hardware components also requires often intense extraction and processing of natural resources (e.g., cobalt, lithium, etc.) and component manufacturing (e.g., semiconductor fabrication and assembly). Environmental impacts include soil contamination, deforestation, erosion, groundwater pollution, and human rights risks.

Figure 5. Greenhouse gas emissions by digital intensity of the sector, 2019



Notes: Greenhouse gas emissions refer to the sum of GHGs that have direct effects on climate change and are considered responsible for a major part of global warming: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). For Ireland and Luxembourg, data refer to 2018.
Source: OECD Going Digital Toolkit, based on OECD Air Emissions Accounts, https://oe.cd/ds/aea, and OECD Structural Analysis (STAN) Database, http://oe.cd/stan, https://goingdigital.oecd.org/indicator/56.

Recent economic recovery packages emphasise structural reforms to reduce carbon emissions, acknowledging that digital and "green" policies are intertwined. To harness the potential of digital tools to aid the green transition, governments should support deployment of AI and IoT for efficiency gains in energy networks and manufacturing, including the infrastructure to support them, such as high-speed broadband connectivity and AI computing capacity. The OECD, with partners like the International Energy Agency (IEA), plans to assist governments by examining how digital technologies promote smart energy systems and networks.

Governments should also encourage the use of digital technologies to nudge consumers towards greener choices, using behavioural insights, noting that consumer attitudes towards sustainable consumption may vary across countries and socio-economic groups. To support countries in this area, the OECD's Committee on Consumer Policy plans to undertake a behavioural experiment, testing digital green nudges in e-commerce with a view to developing a Recommendation on Sustainable Consumption.

Given that digital technologies' negative environmental impacts might offset their benefits, it is imperative that policies to use digital technologies in the green transition address such impacts, including adopting technologies with lower energy needs or those powered by renewable sources. For example, next-generation networks, such as fibre[5] and 5G, might be more sustainable and energy-efficient (Telefónica, 2021[53]; Telefónica, 2021[54]). However, more accurate and reliable measurement is needed in this area. Total energy use, the source of that energy, and characteristics such as water consumption, use of raw materials, durability and recyclability are crucial to understanding a technology's environmental impact and to develop policies that foster more sustainable digital tools and encourage their more efficient use throughout their lifecycle (OECD, 2022[9]; BEREC, 2021[55]).

While several OECD instruments encourage comparable measurement and reporting of the environmental impacts of ICTs and networks (OECD, 2010[15]; OECD, 2021[17]), a variety of different metrics are used to calculate the energy consumption of different digital technologies. The OECD is well-placed to help develop a common approach to measuring the environmental impact of communication networks and specific digital technologies such as IoT and AI.

Conclusion: Better societies are within reach

Better policies lead to better lives and better societies. Digital technologies have a key role in reaching these goals. It is now up to governments and policy makers to take action to build more inclusive, connected, sustainable and cohesive societies.

To close digital divides and foster connected societies, policy makers should close access divides and promote next-generation broadband networks capable of meeting current and future demands for high-quality communication services. Countries can do so by strengthening regulatory frameworks that foster investment in next generation networks, promote competition and facilitate network deployment. Tailored policies can help countries bridge connectivity divides, especially in rural and remote areas. To build more inclusive societies and bridge skill gaps, countries should consider ensuring all in society can access quality education, re-skilling and upskilling programs to gain the digital skills needed for the future, with particular emphasis on disadvantaged and elderly populations. Addressing the digital gender gap requires tackling gender stereotypes, enabling enhanced, safer, and more affordable access to digital tools, and removing barriers to girls' and women's participation in the digital world. Underlying these policy actions, tracking metrics such as broadband adoption, coverage and quality, as well as digital skills to encourage wider uptake of digital technologies is also needed.

To build more cohesive societies, government should fight the online dissemination of harmful content. Such content increases social polarisation, undermines trust in democratic institutions and negatively affects the well-being and the cohesiveness of society. Individuals, firms and governments must work together in multi-stakeholder processes to reduce these negative effects. Tackling this complicated and pernicious issue – while upholding freedom of expression – requires efforts to promote digital literacy initiatives, develop content moderation approaches with independent oversight, harness the power of people and technology, increase transparency in spending on online political advertisements, and measure the scale, content, and reach of the phenomenon.

To ensure more sustainable societies, policy makers should include digital technologies in their green transition policies. Smart devices can reduce energy consumption, and digital nudges can encourage consumers to make greener choices. It is also critical for policy makers to ensure that digital technologies do not contribute to environmental problems. Being able to measure and compare the environmental impact of digital technologies and communication networks will help governments develop policies that foster a green transition. Programs to address digital devices at end of life (e.g., repair, recycling, and rules around planned obsolescence) will also be needed to reduce e-waste.

Strong and robust metrics are required for evidence-based policies. Making these publicly available promotes transparency for consumers and adds new dimensions for competition in relevant markets. Better measurement of digital divides, harmful online content, and environmental impacts of digital technologies and communication networks will enable policies to address these challenges. Given its expansive work on the digital economy, and its growing membership, the OECD can facilitate consensus and collaboration on new measurement tools and metrics for digital technologies. This can include the definition of new metrics and a framework to collect them that allows for comparison across countries, as recognised in the OECD's Going Digital Measurement Roadmap (OECD, 2022[10]).

Achieving better societies will not be easy. Leaders face political and policy trade-offs when attempting to solve problems for which no perfect solution exists. However, with a robust evidence-base and international dialogue, co-operation, and action, more cohesive, connected, inclusive, and sustainable societies are within reach.

Notes

[1] Regions within the 38 OECD countries are classified into two territorial levels reflecting the administrative organisation of the countries. The 433 OECD large (TL2) regions represent the first administrative tier of subnational government (e.g., Ontario province in Canada). The 2 296 OECD small (TL3) regions correspond to administrative regions, except in Australia, Canada, and the US. TL3 regions are contained within TL2 regions, except for in the US, where Economic Areas cross State borders. In Colombia, Costa Rica, Israel, and New Zealand, TL2 and TL3 levels are equivalent. All regions are defined within national borders (OECD, 2022[61])

[2] A digital twin is "a digital representation of a real-world entity or system. The implementation of a digital twin is an encapsulated software object or model that mirrors a unique physical object, process, organisation, person or other abstraction. Data from multiple digital twins can be aggregated for a composite view across a number of real-world entities, such as a power plant or a city, and their related processes" (Gartner, 2022[59]).

[3] A nudge is generally "any aspect of the choice architecture that alters people's behaviour predictably without forbidding any option or significantly changing their economic incentives" (Thaler, 2009[56]).

[4] The digital intensity of sectors is defined over the 2001-15 period by (Calvino et al., 2018[58]) using a number of indicators, namely: the share of ICT tangible and intangible (i.e., software) investment; share of purchases of intermediate ICT goods and services; stock of robots per hundred of employees; share of ICT specialists in total employment; and the share of turnover from online sales.

[5] A report by the French regulator, Arcep, cited that fixed fibre networks consumed on average 0.5 W per line, translating into three times less energy than an ADSL line (1.8 W) and four times less than a traditional PSTN line (2.1 W) (Arcep, 2019[60]). A report by WIK Consulting found that a transition to full fibre in the European Union could reduce yearly CO_2 emissions by 79%, assuming that current power sources remain unchanged (WIK-Consult, 2020[57]).

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