Embracing Innovation in Government

GLOBAL TRENDS 2020

OECD BETTER POLICIES FOR BETTER LIVES

OPSI Observatory of Public Sector Innovation

مركز محمد بن راشد للابتكار الحكومي
MOHAMMED BIN RASHID CENTRE FOR GOVERNMENT INNOVATION

WORLD GOVERNMENT SUMMIT

Upskilling and Investing in People

NOVEMBER 2020

TRENDS.OECD-OPSI.ORG

OECD
BETTER POLICIES FOR BETTER LIVES

OPSI
Observatory of
Public Sector Innovation

مركز محمد بن راشد للابتكار الحكومي
MOHAMMED BIN RASHID CENTRE
FOR GOVERNMENT INNOVATION

WORLD
GOVERNMENT
SUMMIT

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

© This work is licensed under a Creative Commons Attribution–ShareAlike 3.0 IGO (CC BY-SA 3.0 IGO), with the exception of sourced images, which are copyrighted as credited.

Table of Contents

04 INTRODUCTION

08 KEY THEME 01: Investing in the public as a critical resource

Empowering the public with digital skills

Learning new cognitive and socio-emotional skills

CASE STUDY: CanCode (Canada)

CASE STUDY: Equalising the Potential for AI (Finland)

36 KEY THEME 02: Upskilling the public service to unlock the potential of government

Fostering and combining skills that promote innovation

Infusing government with new skills for the digital age

Fostering exchanges of skills and capacities

CASE STUDY: An Official Shadows an Entrepreneur (Latvia)

56 RECOMMENDATIONS

58 CONCLUSION

60 REFERENCES

OPSI Observatory of **Public Sector Innovation**

OPSI serves as a global forum for public sector innovation, helping governments to understand, test and embed new ways of doing things through the application of fresh insights, knowledge, tools and connections.

- oecd-opsi.org
- @OPSIgov
- opsi@oecd.org
- oe.cd/opsinewsletter

مركز محمد بن راشد للابتكار الحكومي
MOHAMMED BIN RASHID CENTRE FOR GOVERNMENT INNOVATION

MBRCGI works to stimulate and enrich the culture of innovation within government through the development of an integrated innovation framework. The goal is for innovation to become one of the key pillars of the UAE government with the aim of developing government operations and enhancing competitiveness to make the UAE one of the most innovative governments around the world.

- mbrcgi.gov.ae
- @mbrinnovation
- info@mbrcgi.gov.ae

Introduction

The OECD Observatory of Public Sector Innovation (OPSI) and the United Arab Emirates (UAE) Mohammed Bin Rashid Centre for Government Innovation (MBRCGI) have spent the last year conducting research and analysis to understand how governments and their partners are innovating to cope with rapid change, increasing complexity and uncertainty, accelerating technological transformation and ever-increasing demands from the public. As part of the MENA-OECD Governance Programme,[1] we have conducted extensive research and held a global Call for Innovations crowdsourcing exercise to surface key innovation efforts[2] and met with innovation teams from around the world to hear their stories (Figure 1). Many of the cases identified through this work are included on OPSI's public Case Study Platform.[3]

Figure 1: Crowdsourcing and research to surface trends and cases

Through this work, OPSI and the MBRCGI have found that governments are taking exciting and innovative actions to transform their operations and improve the lives of their people. Throughout 2020, OPSI and the MBRCGI have issued a series of five reports on 2020 trends in public sector innovation,[4] culminating in the launch of this final report at OPSI's two-day virtual event, Government After Shock: An unconventional event for unconventional times, on 17-18 November 2020.[5] The trends surfaced for 2020 build upon and demonstrate the evolution of the remarkable efforts detailed in our previous Global Trends series of report.[6]

The first report for 2020, published in July, detailed key themes for *innovative responses to the COVID-19 crisis*, which continues to unfold and presents countless and cascading challenges. In September, the second report found that while governments continue to grapple with COVID-19, they are taking action to bring about *seamless government* by innovating to eliminate points of friction with those they serve and actively shaping tomorrow's possibilities with action today. In October, the third report in the series explored the issues of *focusing on the overlooked*, and how governments are using innovative approaches to provide new opportunities for disadvantaged and underserved groups. Also in October, the fourth report found that governments are cautiously navigating the tensions of *public provider versus big brother* through innovative services that leverage data harvesting and biometrics, such as facial recognition, while trying to avoid the ethical dilemmas posed by the use of such technologies.

1 https://oe.cd/mena-gov.

2 https://oecd-opsi.org/call-for-innovations-2020.

3 https://oecd-opsi.org/innovations.

4 Each report and an accompanying digital story are published at https://trends.oecd-opsi.org.

5 See https://gov-after-shock.oecd-opsi.org. All innovators are invited to participate.

6 The reports for 2017-19 are available at https://oe.cd/innovationtrends.

For the fifth and final report in this series, OPSI and the MBRCGI's research explores how governments are *upskilling and investing in people* in innovative ways. Leading efforts in this area fall under two key themes:

01 : Investing in the public as a critical resource

Investing in the digital, cognitive and socio-emotional skills of all citizens and residents to ensure they are able to meet 21st century challenges and possibilities.

02 : Upskilling the public service to unlock the potential of government

Infusing the public service with new skills for innovation, collaboration and digital transformation through innovative training and capacity-building initiatives.

These themes are discussed in this report alongside real-world examples and case studies.

CanCode

CANADA

An innovative government upskilling initiative designed to provide young Canadians with 21st century skills. CanCode has provided funding of EUR 71 million (equivalent) to 27 nonprofit organisations, with the aim of providing more than 4 million upskilling and learning experiences to students and teachers.

Equalising the Potential for AI

FINLAND

To provide the human resources for its ambitious national AI strategy, the University of Helsinki and the company Reaktor Education have launched Elements of AI, a free online training course open to all. Over 530 000 students have signed up, and the programme is in the middle of a massive expansion, with the goal of training 1% of European citizens in AI skills.

An Official Shadows an Entrepreneur

LATIVA

An initiative that promotes design thinking and user-centred approaches by matching public officials with entrepreneurs to exchange knowledge and experiences, and enhance skills in government. Public servants gain new insights and better understand how their work impacts end users. Entrepreneurs are able to obtain feedback on solving potential issues or problems.

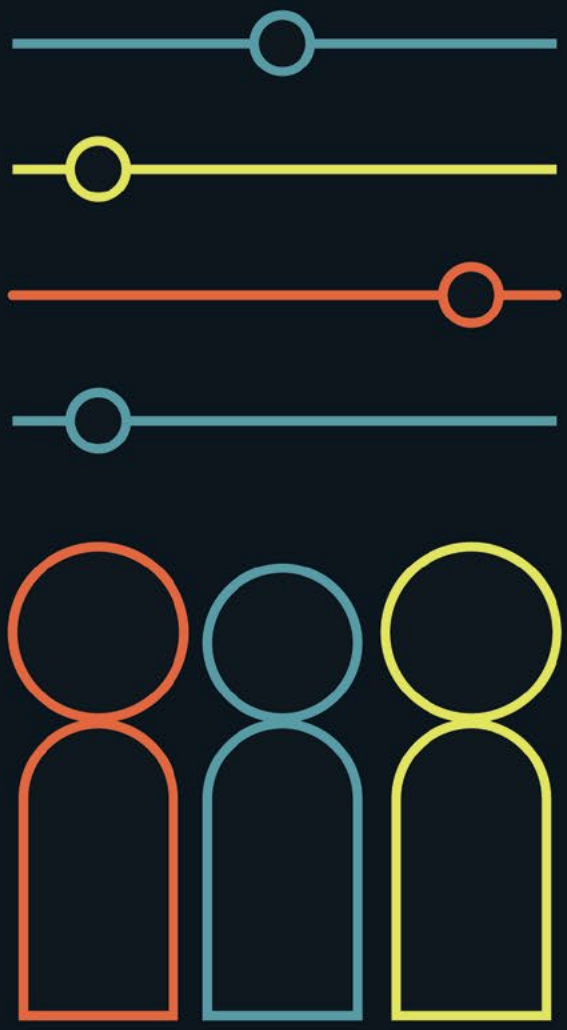
OPSI and the MBRCGI celebrate these efforts and hope that they can inspire others to take action and replicate these successes.

As a result of this work, OPSI and the MBRCGI have developed three key recommendations to help guide governments in.

1. Make upskilling a priority mission.
2. Ensure an equal focus on environment and structures.
3. Take extra measures to ensure all parts of society have equitable opportunities.

KEY THEME 01

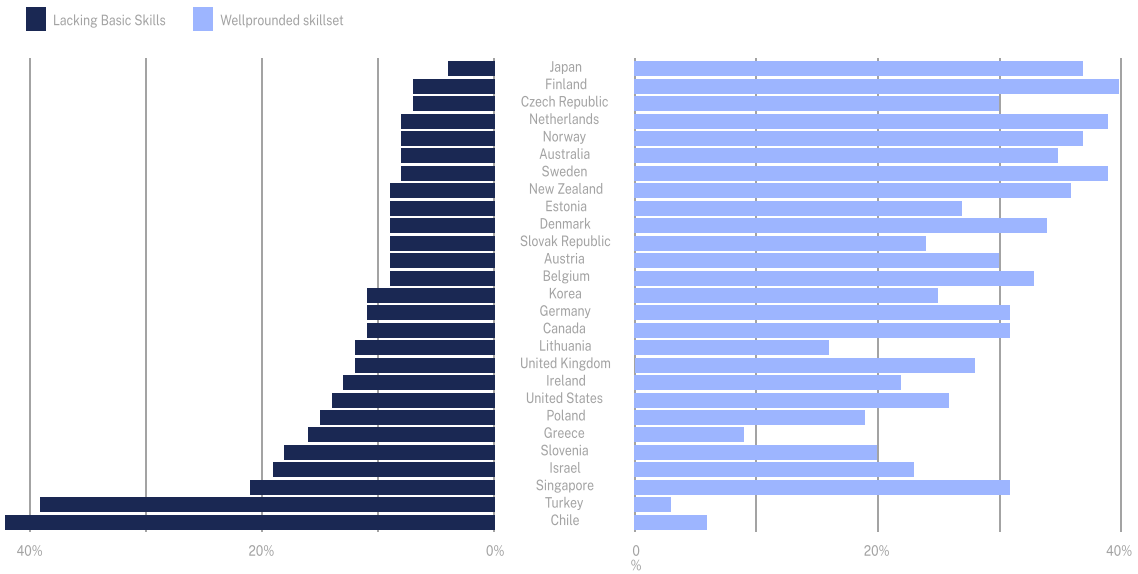
Investing in the public as a critical resource



Governments have long been concerned with ensuring their citizens and residents are equipped with the right skills to help their countries remain competitive and to promote public wellbeing. However, technological progress through new fields such as artificial intelligence (AI) and robotics is now transforming economies, governments, societies and people's lives (OECD, 2019a), and the ways in which we work, learn, communicate and consume are being transformed in complex, unpredictable and radical ways. The *OECD Employment Outlook 2019* estimates that 14% of existing jobs could disappear as a result of automation over the next 15-20 years, with another 32% likely to change fundamentally as tasks are automated (OECD, 2019b). There is growing awareness among the public of these risks. A Boston Consulting Group (BCG) survey of 366 000 people in 197 countries found that 61% of people believe that their job will be significantly affected (Kovács-Ondrejkovic et al., 2019), although some research shows that those most at risk are the least aware and prepared for this outcome (Cusack and Zheltoukhova, 2020). It is clear that most workers will need to upskill or reskill (Dondi et al., 2020), and countries that are unable to instil the skills and capacities to succeed in these rapidly changing times are at risk of being left behind. Such skills include not only digital skills, but also new types of cognitive (e.g. digital literacy, problem solving) and socio-emotional competencies (e.g. the ability to work collaboratively and flexibly) (OECD, 2019a).

While challenging, such change, if seized, represents tremendous potential to boost productivity and improve wellbeing at new scales. Previous transformations show that more prosperity can be created than lost (World Bank, 2019), as long as sufficient preparations are made. OECD research has shown that governments can improve lives by taking comprehensive action to promote these skills, for example, by promoting life-long learning, breaking down inequalities in learning opportunities and changing school programmes to adapt to changing realities (OECD, 2019a). However, countries vary significantly in their mix of skills (see Figure 2), with regard to exposure to digitalisation. Only a few countries are adequately prepared to thrive in the digital world (i.e. Belgium, Denmark, Finland, the Netherlands, New Zealand, Norway and Sweden). Unprecedented times therefore call for innovative approaches to ensure that no one is left behind and that governments and their societies can thrive. Accordingly, governments have created many innovative initiatives to invest in the skills and capacities of their people. The potential for such efforts is significant and, encouragingly, the BCG survey also identified a strong willingness to learn among the public, with a majority of people (65%) already devoting a significant amount of time to acquiring new skills, while 67% were willing to re-skill in order to find a new job (Kovács-Ondrejkovic et al., 2019). In the European Union, 75% of citizens also report believing that technology overall benefits workplaces (World Bank, 2019). It is therefore largely up to governments to ensure that the positive benefits outweigh the negative.

Figure 2: Skills mix of populations by country (%)



Source: OECD Skills Outlook 2019 (www.oecd.org/education/oecd-skills-outlook-e11c1c2d-en.htm), based on www.oecd.org/skills/piaac/publicdataandanalysis.

Empowering the public with digital skills

A clear theme in this area is the development of innovative policies and programmes to help citizens and residents learn the digital skills they need to adapt to change and reap the benefits of the digital transformation. Such initiatives also reduce the risk of automation exacerbating inequalities and long-term unemployment. OECD work has found that, so far, education has not been at the front line of digitalisation (van der Vlies, 2020). To help address this issue, many countries have created overarching strategies and policies, at the highest level, to promote digital innovation in education. About half of OECD countries have issued formal digital education strategies, with the remainder, in many cases, incorporating digital education components into a broader national innovation strategy. Germany has gone as far as to amend its constitution to establish *DigitalPakt*, a digital education framework operating across different levels of government, with EUR 5 billion in funding allocated for 2020-24 (van der Vlies, 2020).[7] In another example, the Estonia 2020 digital agenda pledged to update educational curricula to respond to changing digital skills.[8] With a focus on teacher development, Spain has built a common teaching framework and competencies for information and data literacy, communication and collaboration, and digital content creation, among others (van der Vlies, 2020).

Innovative skills initiatives and objectives are also often included in tech-specific strategies. This is especially true in the case of AI. For instance, OPSI found that over 50 countries have developed national AI strategies, most of which call for training and skills programmes for the public and public servants within government.[9] Such efforts are well aligned with the OECD Principles on AI, which recommends that governments build human capacity and prepare for labour market transformation.[10] One of the most innovative and ambitious of these initiatives is Finland's efforts to equalise the potential for AI through its *Elements of AI*,[11] a free online course which aims to train 1% of the population to using artificial intelligence (Delcler, 2019). The course has since been expanded across Europe (see case study later in this report). Dedicated funding for upskilling is also a common theme, with the United Kingdom investing about EUR 22 million (equivalent) in 2 500 AI and data science "conversion degrees", 1 000 scholarships and an Adult Learning Technology Innovation Fund, with an added focus on boosting gender diversity and upskilling those already in the workforce (OECD, 2019c).

However, this raises the matter of what *skills* people actually need in order to thrive in the digital world. At present, there is an ongoing debate about what the term "digital skills" actually means (van der Vlies, 2020), with some organisations attempting to identify and prioritise these skills in terms of importance. Within the European Union, the European Digital Competence Framework 2.0 (DigComp) looks at five areas of digital competence and serves as a tool designed to help citizens improve their understanding and capabilities (see Box 1).

Box 1: Areas of the European Digital Competence Framework

1. **Exercise prudence:** To articulate information needs, to locate and retrieve digital data, information and content. To judge the relevance of the source and its content. To store, manage, and organise digital data, information and content.
2. **Communication and collaboration:** To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.
3. **Digital content creation:** To create and edit digital content. To improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied. To know how to give understandable instructions for a computer system.
4. **Safety:** To protect devices, content, personal data and privacy in digital environments. To protect physical and psychological health, and be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technologies and their use.
5. **Problem solving:** To identify needs and problems, and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up to date with digital evolution.

Source: https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework.

7 www.bmbf.de/de/wissenswertes-zum-digitalpakt-schule-6496.php.

8 www.mkm.ee/sites/default/files/digitalagenda2020_final.pdf.

9 See *Hello, World: Artificial Intelligence and its Use in the Public Sector* (November, 2019) at https://oe.cd/helloworld.

10 https://oecd.ai.

11 https://course.elementsofai.com.

Also related to identifying what skills are needed, the International Telecommunication Union (ITU) has developed a Digital Skills Toolkit[12] that addresses the complexities of advancing digital skills at policy level. It maps out how digital skills take their place within a wider framework of 21st century skills, and offers guidance on bringing together – and leading – different stakeholders in order to move forward under one clear and focused framework. The Open Data Institute (ODI) has developed an interesting Data Skills Framework[13] that helps to shed light on the skills needed for data innovation in particular. The frameworks aims to "analyse your current approaches to data literacy, identify imbalances of skills, and address gaps in data literacy across your organisation", and is generally consistent with OPSI's findings in this area (Figure 3). While not explicitly aimed at the public sector, The New York Times has developed and made publicly available a robust crash course in data skills based on its experience regarding important data literacy skills for journalists.[14] The OPSI Toolkit Navigator provides additional resources and orient users around a vast collection of innovation toolkits, including those related to skills making and upskilling, so that users can find those best suited to their situational needs.[15] Looking towards the future, it may be possible to use data to identify future skills needs. The United Nations Development Programme (UNDP) has tested ways of using real-time data from social networks (e.g. LinkedIn) to identify emerging trends and skills needs (Basu, 2020). Such efforts are new but promising, and warrant further experimentation.

Figure 3: Data Skills Framework

Source: https://theodi.org/article/data-skills-framework.

Once specific skills objectives are known, governments and their partners are able to develop innovative and concrete actions that help convert strategies, frameworks and identified skills gaps into something more tangible. One of the most ambitious efforts in this regard is the European Commission's recently announced European Digital Academy (EDA),[16] which aims to upskill and train the public in emerging technologies, including AI, the Internet of Things, blockchain, cybersecurity and robotics. Still under development, the EDA will include a Digital Skills and Jobs Portal, and will focus particularly on young people, students and women. The portal will map upskilling programmes across Europe, and also provide new, innovative online training courses.

12 See https://oecd-opsi.org/toolkits/digital-skills-toolkit for the Digital Skills Toolkit on the OPSI Toolkit Navigator.

13 https://theodi.org/article/data-skills-framework.

14 See https://open.nytimes.com/how-we-helped-our-reporters-learn-to-love-spreadsheets-adc43a93b919 and https://drive.google.com/drive/u/3/folders/1ZS57_40tWuIB7tV4APVMmTZ-5PXDwX9w.

15 https://oe.cd/toolkit.

16 See https://ec.europa.eu/digital-single-market/en/news/call-proposals-set-european-digital-academy.

A number of national governments have also developed specific education and training programmes to benefit the public at large. Canada has been a leader in this field – its Future Skills[17] initiative seeks to build a skills development ecosystem that embraces user-centred design principles to support lifelong learning. With an initial investment of EUR 154 million through 2021 and subsequent annual investments of EUR 67.5 million (equivalent), the programme seeks to examine major trends that will impact workers, identify emerging skills for the future, develop new approaches to upskilling and share results across Canada. More recently, the country has launched a Future Skills Council to ensure that policy decisions take into account the skills needs of inhabitants, and established a Future Skills Centre to develop, test and measure new approaches to skills assessment and development. The United Kingdom also has produced perhaps one of the most mature efforts to enhance digital skills across society (Box 2).

Box 2: United Kingdom efforts to promote digital skills

- The **Digital Skills Partnership** (DSP) brings together the public, private and charity sectors to improve digital capabilities across the whole skills spectrum, including essential skills, reducing digital exclusion, and digital skills for specialist roles.
- The **Digital Skills Innovation Fund** provides EUR 1.1 million (equivalent) to help people from under-represented groups gain the skills they need to work in digital roles, and an additional EUR 437 000 (equivalent) to help older and disabled people obtain life-changing digital skills.
- **Free online training courses** on the use of technology in teaching are offered to teachers and leaders in education in partnership with the Chartered College of Teaching.
- A newly funded **Institute of Coding**, led by the University of Bath, aims to "ensure that employers and individuals across the United Kingdom can access the skills they need to compete in the global digital economy."
- **The Skills Toolkit** consists of free online courses to help people learn new skills, such as digital design and computer science.
- The **CareerTech Challenge**, created by the innovation foundation Nesta in partnership with the Department of Education, aims at "stimulating new solutions for precarious workers", including through online upskilling and retraining. The programme has awarded 31 organisations millions of pounds in funding to execute efforts throughout 2020, and has published lessons learned in promoting learning.

Source: www.gov.uk/guidance/digital-skills-partnership, www.gov.uk/government/news/new-funds-to-boost-diversity-of-people-working-in-digital-and-tech-jobs, https://instituteofcoding.open.ac.uk, https://theskillstoolkit.campaign.gov.uk, www.nesta.org.uk/project/careertech-challenge, www.gov.uk/government/publications/realising-the-potential-of-technology-in-education and *www.nesta.org.uk/blog/future-skills-how-our-innovators-are-transforming-online-adult-learning.*

The UK innovation foundation (and former public body) Nesta (McIvor, 2020) has argued that the United Kingdom's upskilling efforts could have an even bigger impact by making upskilling a "mission" implemented through a highly co-ordinated bundle of activities.[18] Mission-oriented innovation is one of four primary facets of public sector innovation, and involves setting clear time-bound outcomes and an overarching objective for achieving a specific mission, often with backing from the most senior leaders in government (see Box 3).[19] Bringing these criteria under the umbrella of a mission allows for better alignment between all actors and actions towards common, concrete goals. OPSI and the MBRCGI also agree with Nesta's assessment (McIvor, 2020) that upskilling is particularly well-suited to a mission-oriented approach, as it involves many variables that cannot be addressed by a single actor or solution. All governments could benefit from such an approach in this area.

17 See https://oe.cd/ca-future-skills.

18 Nesta is conducting additional relevant efforts in the area of upskilling. Its FutureFit initiative, supported by Google, is working with a number of European countries and other stakeholders to create an effective adult learning system to address inequalities and social exclusion (see www.nesta.org.uk/project/futurefit). Its "Precarious to Prepared" manifesto is a call to action for the United Kingdom to support people at risk of losing their jobs during the next decade (www.nesta.org.uk/report/precarious-to-prepared).

19 See https://oe.cd/innovationfacets for more information about mission-oriented innovation as well as the other three facets of innovation: enhancement-oriented innovation, adaptive innovation and anticipatory innovation. See also https://oecd-opsi.org/missions-21st-century-drivers-of-innovation.

Box 3: Five key criteria for a mission

Mission-oriented innovation expert Professor Mariana Mazzucato states that missions must:

1. Be bold and inspirational with wide societal relevance.
2. Have a clear direction that is targeted, measurable and time-bound.
3. Be ambitious but realistic when setting research and innovation actions.
4. Be framed to spark cross-disciplinary, cross-sectoral and cross-actor innovation.
5. Involve multiple, bottom-up solutions.

Source: https://ec.europa.eu/info/sites/info/files/mazzucato_report_2018.pdf.

One of the strongest themes in innovative initiatives is a specific focus on coding, as exemplified by the Government of Canada's successful CanCode programme (see the case study later in this report). As touched on above, Canada overall has displayed maturity in terms of its focus on upskilling, as profiled in previous trends reports.[20] Meanwhile, Greece has launched a similar initiative to transform school classrooms into coding innovation labs, focusing on students aged 7-9.[21] The initiative took shape in late 2018, initially employing a "train-the-trainer" model to train 21 teachers from different regions in coding and innovation lab methodologies. The new teachers then assembled an initial cohort of 109 students for a two-day coding workshop to generate ideas which formed the basis of work for the next five months. In March 2019, the students present their efforts and were recognised by the Minister of Interior. The programme was deemed a success and has been scaled up to take on many more students, and foster coding and other skills such as project management, communication and team work. In the United Arab Emirates (UAE), the government has launched the One Million Arab Coders initiative (Box 4).

Box 4: One Million Arab Coders (UAE)

One Million Arab Coders use an educational platform to build on the Udacity platform which offers free digital skills training, certifications, job opportunities, as well scholarships and cash prizes to top students. A paid version allows students to access live mentors 24/7 for a low fee.

The programme is the largest of its kind in the Arab world, with over 375 000 participants so far, including 3 600 tutors from global companies. It aims to provide one million young Arabs with the essential future skills required for the labour market, notably by learning the language of the future: coding. The objective is to create a new generation of digital experts equipped with the tools to understand and lead the future through digital transformation. Certificates are signed by the UAE's Minister of AI and contain a unique code that can be verified by employers. The initiative has also partnered with a jobs platform to help graduates find opportunities in the programming field.

Source: www.arabcoders.ae and https://mentor.arabcoders.ae.

While most recent initiatives have had a broad focus in terms of audience, many innovative efforts have been developed in specific target areas with particular objectives. A leading focus area has been building digital skills among older workers, who often hold more precarious jobs in terms of automation risk. A good example of this is in Singapore, which is trying to address the challenges associated with an ageing workforce by developing a tech skills accelerator focused on mid-late career professionals, in order to help them remain relevant (Huawei, 2018).[22] Outside of government, a recent viral video[23] of Masako Wakamiya, an 81 year-old Japanese woman who learned to code in order to create game apps for senior citizens, proves that coding can activate and upskill many different segments of society. Wakamiya has now made it her personal mission to get senior citizens more involved with tech.

20 See, for example, the Brookfield Institute for Innovation + Entrepreneurship (https://brookfieldinstitute.ca).

21 See https://oecd-opsi.org/innovations/transforming-school-classrooms-into-real-innovation-labs and www.innovation.gov.gr.

22 See www.imda.gov.sg/programme-listing/TechSkills-Accelerator-TeSA.

23 https://youtu.be/UFYJ2DE9wlM.

Another key focus area is fostering digital skills to bridge the digital gender divide. OECD work has found that women and girls are at a relative disadvantage when it comes to digital literacy, due to multiple factors including inherent gender biases, socio-cultural norms and a lack of provision of digital skills (OECD, 2018). Furthermore, the OECD found little evidence to suggest noticeable progress in the last decade. These findings underscore the need for government efforts targeted at upskilling women and girls. A number of programmes in this area are underway, including the EQUALS and #eSkills4Girls initiatives (Box 5); however, OPSI and the MBRCGI find that more action is needed, especially given the extent and significance of the problem and the lack of progress over time.

Box 5: The EQUALS and #eSkills4Girls initiatives

EQUALS is an initiative implemented by a broad coalition of international organisations (ITU, UN Women and others) with a mission to bridge the gender digital divide. The partnership brings together stakeholders from across sectors to focus efforts on digital access, skills, leadership and research. The initiative created an interactive and continually updated Gender Digital Inclusion Map to visualise initiatives working towards bridging the gender digital divide around the world, and to identify key organisations and best practices in this area. The purpose of EQUALS is to show what education policies can do to help close the skills divide, building on the work of other groups and coalitions. Recently EQUALS added a Digital Skills Fund to their portfolio to support capacity building and skills training.

#eSkills4Girls is an initiative launched under the German G20 presidency with the aim of tackling the gender digital divide. Its objectives are to globally increase access and participation by women and girls in the digital world, and to boost relevant education and employment opportunities in developing countries. This platform is a joint project supported by G20 members and backed by several international organisations, including the OECD. The platform aims to collect and disseminate information and knowledge on the gender digital divide and to showcase initiatives, good practices and policy recommendations.

Source: www.oecd.org/going-digital/bridging-the-digital-gender-divide.pdf, www.equals.org/skills and www.eskills4girls.org.

While the efforts discussed so far are largely national-level initiatives, innovative efforts to build digital skills have also taken root at sub-national levels. One notable example is in Denmark, where the Aarhus municipality's "Datademocracy" programme,[24] based at the central library, is working to equip citizens and school children with data literacy skills. The municipality believes that subjects such as data and AI are not the exclusive preserve of experts and tech giants, and wants to upskill citizens to engage in dialogue on decisions being made on data that affect them. Similar local training efforts are taking place in Bloomington, Indiana,[25] and Brisbane, Australia,[26] among others.

Finally, as with almost every policy area, the COVID-19 crisis has demonstrated the urgency of making progress in digital skills. Efforts in this area received early encouragement from the private sector, with Google partnering with low cost airline AirAsia to launch a tech academy to upskill employees on data analytics and AI, among others.[27] Government-led initiatives also appear to be bubbling to the surface (Holland, 2020). For instance, the UK Government has launched a EUR 2.2 billion (equivalent) "Kickstart Scheme"[28] to help young people gain new skills and enter new positions, as research shows that they are the group most likely to lose employment as a result of the COVID-19 crisis (Gustafsson, 2020). The pandemic has also underlined the need to speed up the digitalisation of teachers' skillsets, as is being done in the CanCode case study.

24 https://datademocracy.dk.

25 https://bloomington.in.gov/news/2020/09/15/4581.

26 www.brisbane.qld.gov.au/things-to-see-and-do/council-venues-and-precincts/libraries/library-programs/free-digital-literacy-training.

27 See www.cnbc.com/2020/01/16/google-teams-up-with-airasia-to-launch-new-tech-academy.html.

28 www.gov.uk/government/publications/a-plan-for-jobs-documents/a-plan-for-jobs-2020.

These efforts are promising and indicate that countries are moving in the right direction; however, there are also some red flags. Developing countries in particular will need to move quickly to keep up, as many are not yet making the necessary investments. The third report in the Global Trends 2020 series explored how governments in these areas are innovating to expand infrastructure (e.g. electricity and Internet access), but more needs to be done in the area of skills. As the World Bank notes, such countries "have to invest in their people with a fierce sense of urgency – especially in health and education … to harness the benefits of technology and to blunt its worst disruptions" (World Bank, 2019).[29] The recent Foresight Africa report[30] published by the Brookings Institution[31] identifies a lack of relevant technical skills across the continent, especially among the young, as well as significant challenges in keeping up with the digital transformation. Some efforts are bubbling to the surface, such as a new agreement between IBM and the Government of Nigeria[32] to collaborate on digital skills in the country. However, such efforts are few and far between.

Learning new cognitive and socio-emotional skills

Significant attention is devoted to digital skills; however, citizens and residents also require strong cognitive and socio-emotional skills in order take advantage and compete in the digital revolution (OECD, 2019a). While training in these types of skills is not usually considered innovative, some governments have devised innovative ways to encourage learning in this area, or have developed programmes that cover new types of topics.

One 21st-century skill that governments are working to instil in people is how to spot and understand fake news and disinformation.[33] While propaganda and misleading information are old challenges, there has been a sharp rise in disinformation globally, facilitated notably by social networks – an issue that has acquired particular significance during the Coronavirus pandemic. This trend is likely to worsen, as AI-enabled deep fakes and machine-generated fake news become easier to create and more difficult to distinguish from reality. This poses fundamental challenges for public governance, public trust and wellbeing. Innovative initiatives aimed at addressing this problem include the following:[34]

- The Government of Estonia has developed training on disinformation as part of a broader digital competence strategy that seeks to ensure that students are taught relevant, 21st-century skills (Rohaidi, 2019). The country has also developed measurement indicators to track student progress.
- In neighbouring Finland, Faktabaar (FactBar), an organisation specialising in fact-checking, has helped schools to adopt fact-checking methods to promote critical thinking online (Charlton, 2019).
- The governments of Belgium and France provide tools, training courses and engagement opportunities between students and journalists to increase resilience to disinformation (Matasick, Alfonsi and Bellantoni, 2020).

However, despite greater emphasis on this area, more actions are warranted. Recent OECD research showed that, as of July 2019, only a few open government action plan initiatives worldwide incorporated a response to the challenges of disinformation or misinformation (Matasick, Alfonsi and Bellantoni, 2020). The European Commission has stated that "for media and information literacy to be effective, it should be implemented on a massive scale in school and university curricula and in teacher training curricula, with clear methods of evaluation and cross-country comparison" (European Commission (2018).

29 While this trends report focuses on upskilling, developing countries face other structural challenges that exist in parallel which also affect their ability to invest in skills. For instance, many face challenges in strengthening social protections and raising revenues to pay for investments. These issues fall outside the scope of this report, but are covered in depth by *The Changing Nature of Work* (2019) published by the World Bank. See http://documents1.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf.

30 See www.brookings.edu/multi-chapter-report/foresight-africa-top-priorities-for-the-continent-in-2020.

31 www.brookings.edu.

32 www.premiumtimesng.com/news/more-news/373187-nigerian-government-signs-agreement-for-digital-skills-development.html.

33 At a more foundational level, the open government principles of transparency, integrity, accountability and stakeholder participation can help protect and expand space for information sharing, dialogue and engagement between governments and citizens. These principles address the underlying problem of increasing social fragmentation, and the broader erosion of trust in institutions and experts, which if not addressed, will continue to serve as fuel for disinformation. OECD work in this area is led by its Open Government Unit and can found at www.oecd.org/gov/open-government.

34 While not focused on enhancing skills for detecting disinformation, the 2020 Global Trends report on Innovative COVID-19 Responses discussed a number of innovative government initiatives to combat disinformation during pandemic. See https://oe.cd/c19-innovation.

Another long-studied subject of critical relevance in the digital age is ethics. A significant body of research, including work done by the OECD and OPSI, focuses on the need to understand and apply ethical standards to digital technology applications.[35] Some governments have developed innovative programmes to instil these ethical values and related skills among their people, often from an early age. One such example is Australia's Digital Compass (see Box 6). In the United States, the public university Georgia Tech has developed the "Deliberate Innovation, Lifetime Education"[36] programme which seeks to re-imagine higher education and provide students with cognitive, interpersonal and intrapersonal skills, including a strong focus on ethics. Governments are the most important actor in promoting these skills and setting standards for ethics. A 2019 PwC survey of companies found that about 75% of respondents see the government as the main body responsible for developing digital ethics standards, with the majority also stating that the greatest challenge to ethics is a lack of appropriate skills (PwC, 2020).

Box 6: Digital Compass (Australia)

The Digital Compass was designed through a partnership between the Behavioural Insights Team (BIT), the Vincent Fairfax Family Foundation and the Alannah and Madeline Foundation (AMF), with the in-depth involvement of young people recruited through social media. It represents an innovative approach to supporting teenage Australians to develop ethical behaviours in a complex digital world. Most traditional strategies focus on risk aversion and use restriction, while other efforts were not sufficiently evidence-based and were unlikely to result in behavioural change.

The novel approach of the Digital Compass focuses instead on stimulating thought-provoking group discussions about ethical online dilemmas, offers evidence-based tips and tricks, and allows students to compare data on their online behaviour with peers. Digital Compass is designed to help young people develop ethical habits that adapt as technology changes. It also give them agency to play a role in making the online world a better place by developing habits of self-reflection, making digital environments more salient and developing self-efficacy in online conflicts, among other activities. The students report on their online habits and how they make them feel, and then compare them with the experiences of their peers.

The programme is delivered in schools with one class per week over an eight-week period. It is targeted to students around 14-15 years old – an ideal developmental age to encourage lasting change. To date, it has been piloted in five schools, with a randomised control trial planned for later this year to evaluate impact.

Source: : https://digitalcompass2019.typeform.com/to/ux2TLI; www.amf.org.au/news-events/latest-news/seeking-nsw-schools-for-ethical-and-online-behaviour-trial, www.themandarin.com.au/125977-teens-capable-of-dealing-with-ethical-challenges-online-when-equipped-with-the-right-skills-program-finds

Another 21st century challenge that demands new skills and capacities is complexity. Finland's Innovation Centre,[37] based in the Finnish National Agency for Education, has developed the Experimentation Lab to help teachers, school leaders and local education administrators co-create local solutions to address complex challenges and simultaneously inspire transformation in education governance. The Lab brings together teams from across municipalities in Finland that work together to effect systems-level change. In particular, it works to build capacity (skills, competencies, mindsets) among teachers and school leaders to actively develop teaching and learning through experimenting, trialling and co-creating solutions at the local level.

The efforts covered so far can largely be classified under the umbrellas of digital and cognitive skills. New efforts are also underway to balance these out with the socio-emotional skills required to work collaboratively and flexibly (e.g. conscientiousness, empathy, teamwork). These are sometimes called "soft" skills, but are nonetheless critical for adapting to the demands of the future of work and society. A number of countries have integrated these skills into school curricula (e.g. Australia, Korea, Singapore), and in the United Kingdom, England has promoted the adaption of educational school programmes to better emphasize character and resilience, and has provided Character Awards to celebrate schools that have developed innovative programmes that help to develop these traits. Also within the United Kingdom, Wales has drafted a new "wider skills" school curriculum for 2022 (Welsh Government, 2019), including a key area on creativity and innovation.[38]

35 See, for example, the OECD's AI Principles and AI Policy Observatory (https://oecd.ai) and the OPSI report Hello, World: Artificial intelligence and its use in the public sector (https://oe.cd/helloworld).

36 https://provost.gatech.edu/sites/default/files/documents/deliberate_innovation_lifetime_education.pdf.

37 See https://oecd-opsi.org/innovations/experimentation-lab and https://kokeilukeskus.fi/kokeiluohjelmat.

38 https://s3-eu-west-1.amazonaws.com/hwb-live-storage/cd/b4/f8/7c/b7d34ffb968d9a09de4d460c/a-guide-to-curriculum-for-wales-2022.pdf.

KEY THEME 01: Case Study

CanCode

Canada

"Young Canadians are the leaders of tomorrow and will drive our economic success for years to come. By investing in resources that teach them digital skills, our government is helping them transition successfully from classrooms to research labs, shop floors or boardrooms, and giving them the tools to succeed in tomorrow's digital economy."

– The Honourable Navdeep Bains,
Minister of Innovation, Science and Economic Development, Canada[39]

CanCode[40] is an innovative upskilling effort from the Government of Canada designed to prepare young Canadians for educational programmes and careers in science, technology, engineering and maths (STEM) fields, and to help them compete in the digital era. CanCode upskilling programmes are provided through third-party, non-profit organisations and cover subjects such as coding, app development, computational thinking, data analysis and robotics. The initiative aims in particular to reach populations that are underrepresented in STEM (e.g. girls, minorities, indigenous persons, those with disabilities and people in remote communities). Professional training and development is also available for teachers to help them teach digital skills in the classroom. CanCode is over halfway towards its current goal of providing more than 4 million upskilling and learning experiences to students and teachers.

The problem

Digital technologies have changed education and jobs in every sector and at every level in Canada, from basic entry-level jobs to positions requiring a sophisticated level of knowledge. Canada's success in the digital economy depends on leveraging its diverse talent and providing opportunities for all to participate in the marketplace. This means ensuring that its citizens are equipped with the knowledge and skills they need to keep up with the pace of change and remain competitive in the digital era. The country already has a highly educated workforce; however, more needs to be done to ensure that Canadians are able to learn, adapt and have good jobs throughout their working lives. The government's Innovation and Skills Plan[41] seeks to better prepare Canada for success, and includes a key pillar on upskilling young Canadians with the skills and experience they need to kick-start their careers. The key challenge is ensuring that children leave school adequately equipped to become the next generation of professionals – and that none are left behind.[42]

39 www.canada.ca/en/innovation-science-economic-development/news/2019/08/minister-bains-announces-investment-to-help-prepare-young-canadians-for-tomorrows-jobs.html.

40 See the CanCode website at www.ic.gc.ca/eic/site/121.nsf/eng/home.

41 www.budget.gc.ca/2017/docs/plan/chap-01-en.html.

42 Unless otherwise cited, the details for this case study were sourced from an interview and correspondence with Government of Canada officials who manage the CanCode programme.

An innovative solution

To help meet the goals laid out in its Innovation and Skills Plan and to equip youth with the skills needed to compete in the digital age, the Government of Canada launched CanCode with an initial investment of CAD 50 million (EUR 32 million equivalent) in late 2017 (OECD, 2017a). CanCode sets out to equip Canadian youth (students in kindergarten through to the end of secondary education), including underrepresented groups (girls, Indigenous youth, youth with disabilities and youth living in remote or rural regions) with the skills they need to be prepared for further studies, including advanced digital skills and STEM courses, leading to the jobs of the future. It also supports initiatives that provide teachers with training and professional development opportunities to help them introduce digital skills (e.g. data analytics, digital content development) and coding in the classroom. The underlying premise for the programme goes beyond just teaching students how to create a game or design an app; rather, learning digital skills such as coding at a young age helps to instil analytical skills and problem-solving techniques that are essential for further study and careers in STEM fields. It also enables them to become active creators of digital technology and content, rather than passive consumers of digital content.

Figure 4: Minister Navdeep Bains engaging with CanCode participants

Source: https://twitter.com/NavdeepSBains/status/1110618256191176704.

While CanCode is co-ordinated centrally by the government, upskilling efforts are carried out by Canadian non-profit organisations with experience in the delivery of coding and digital skills programmes to youth and teachers. The governments operates a competitive, merit-based process where interested nonprofits submit proposals for funding, which the government evaluates against a set of criteria,[43] including:

43 See www.ic.gc.ca/eic/site/121.nsf/eng/00002.html for full evaluation criteria.

- All proposed courses are targeted at the right populations and oriented around appropriate training content.
- There will be no cost to the participants.
- The NGO has the capacity and expertise to deliver the proposed training, and can do so within the programme timeframes.

Proposals are also evaluated based on the extent to which the offerings can be adapted to learning curricula, will result in tools and resources available for broader learning opportunities, and can demonstrate an ability to reach underrepresented groups and rural communities, among other factors. In emphasising underrepresented groups, CanCode seeks to be "inclusive by design".[44] This process has enabled a diverse set of organisations to develop upskilling programmes. The government has also worked to ensure that students and teachers across Canada have equitable access to the programme, either in person or through virtual means.

So far, 27 organisations have been awarded funding. Each organisation has the ability to design and implement an upskilling programme that matches the commitments made in their funding application, yet tailored to the specific context and needs of their relevant communities and target groups. For instance, some programmes hold in-person classes and workshops, while others focus on building out virtual programmes. Some programmes work directly with local schools, while others operate on a more independent basis. Each recipient of CanCode funding provides quarterly reports to the government detailing how they have trained students and teachers, and the types of activities undertaken, among others. The CanCode team is also in touch regularly with each recipient to ensure progress is being made and to help address any issues or challenges in programme implementation. The organisations have also developed communities and networks to learn from each other and share best practices.

As a result of the early success of the programme, the government extended the programme in 2019 and allocated an additional CAD 60 million (EUR 39 million equivalent) to further invest in youth digital upskilling initiatives throughout Canada for years 2020-2021, for a total investment of CAD 110 million (EUR 71 million equivalent). The government funds individual programmes at the local level through a competitive process. Awarded projects on the low end are funded at around EUR 225 000 (equivalent), with the largest investments amounting to about EUR 7.7 million.[45] Some active efforts, funded through March 2021,[46] include the following:

- **Black Boys Code**[47] provides digital literacy and programming skills to black male youth aged 8-17 years old. The project delivers coding and programming skills to those in the target group with little or no experience, through in-person workshops conducted by local chapters and hosted on university and college campuses across Canada. The programme has grown to 11 chapters nationwide.[48]
- Canada Learning Code's **Inspiring Canada's Next Generation of Innovators**[49] delivers coding and digital skills programming, and teaches students how to apply coding information across multiple disciplines, such as art, sport, music and history. The project also helps teachers to feel more confident about teaching coding in their classrooms.
- Pinnguaq's project **Sustainable Coding in Rural, Remote and Indigenous Communities**[50] delivers training on topics such as coding, digital art, 3D modelling, animation, VR/AR, digital storytelling, audio and video.
- Mindfuel's **Fuelling Canada's Innovation Sector**[51] is an e-learning platform that provides training on digital literacy and coding, with a goal of reaching 124 000 students and 4 600 teachers.[52]

44 www.ic.gc.ca/eic/site/121.nsf/eng/00001.html.

45 See www.canada.ca/en/innovation-science-economic-development/news/2019/09/cancode-program-project-breakdown.html.

46 See www.ic.gc.ca/eic/site/121.nsf/eng/00003.html for all currently funded CanCode projects. The Government of Canada has also commissioned several promotional videos about other CanCode projects. These included "Create to Learn" (https://vimeo.com/369648124/6cbc8417e0), "Elephant Thoughts" (https://vimeo.com/369660506/2e8a99d389), "First Robotics" (https://vimeo.com/369649035/6175751e3a) and "Pinnquang" (https://vimeo.com/369649738/e4ec3ff424).

47 www.blackboyscode.com.

48 See https://blackboyscode.com/black-boys-code-growing-to-11-chapters-across-canada.

49 www.canadalearningcode.ca/investing-in-the-next-generation-of-canadian-innovators-amazon-joins-canada-learning-code-to-help-kids-unlock-the-power-of-code.

50 https://pinnguaq.com.

51 See https://mindfuel.ca/2019/07/22/mindfuel-awarded-2m-in-cancode-funding-to-support-underrepresented-youth-across-canada.

52 www.canada.ca/en/innovation-science-economic-development/news/2019/07/mp-hehr-announced-new-cancode-investment.html.

Figure 5: CanCode workshop participants

Source: SRL Team 6514 (https://twitter.com/SRL_6514/status/1200803811050377216).

CanCode recipients have developed re-usable materials and designed other projects to equip young Canadians with digital skills. For instance, the Algorithm Literacy Project[53] created by Kids Code Jeunesse (KCJ) and the Canadian Commission for UNESCO (CCUNESCO) raises awareness and educates youth about the presence of algorithms and how they influence our digital experiences. The goal is to empower children to exercise critical thinking in how they engage online, and to become proactive, creative users and makers rather than passive consumers. To achieve these aims, the project partners have created instructional videos, discussion and educational guides, and workshops. In another example, Canada Learning Code has developed *Learning for the Digital World: A Pan-Canadian K-12 Computer Science Education Framework*,[54] to help provide valuable guideposts for teaching computer science from kindergarten to secondary level across the country.

As with practically all government programmes, the COVID-19 pandemic has affected the delivery of CanCode. However, in this case, the changes made to the programme have been transformative. For instance, shifting to a virtual learning environment for many activities strengthened the case for CanCode, and, importantly, resulted in an increase in the number of up-skilling efforts available virtually rather than in person. This outcome has enhanced accessibility for underrepresented groups, especially those in remote areas. CanCode training initiatives have also used the pandemic as a learning exercise and have sought to make use of their new skills to create tangible products. For example, a CanCode initiative working with indigenous groups used their 3D printing skills to create and donate face shields.

Looking towards the future, the government is considering expanding the programme even further with additional funding beyond the current 2021 cycle. The CanCode team believes that there is continued need and demand for the programme, and that renewal could build on the success and momentum built so far. Over time, the CanCode team hopes to see students who have participated in CanCode programme pursue STEM education and career opportunities. They also believe that training teachers will allow the programme to have cascading effects, as these teachers introduce digital approaches and build digital skills with their students.

53 www.algorithmliteracy.org.

54 https://k12csframework.ca.

Figure 6: Teachers learning how to incorporate coding into the classroom

Source: Kids Code Jeunesse (https://kidscodejeunesse.org).

Novelty

One of the most novel aspects of CanCode is its delivery model. Central co-ordination enables the government to set funding criteria and ensure a level of consistency and quality in programming. However, working with third-party organisations for training and content delivery enables flexibility and adaptability to meet specific needs on the ground, and to adjust to the unique contexts of the different communities and underrepresented groups targeted by CanCode. For instance, the CanCode programme encouraged recipient organisations to take additional steps to increase participation by traditionally underrepresented or under-served groups, such as rural and remote communities, Indigenous communities, visible minorities, and learners with disabilities in digital technology fields, in order to meet challenges related to accessing coding and digital skills learning opportunities. The government has paid specific attention to forming local-level partnerships with community groups characterised by high numbers of these traditionally underserved groups.

Results and impact

The government and its partners view CanCode as a very successful initiative. To date, it has provided about 2 million upskilling learning experiences to students and 96,000 training opportunities to teachers.[55] By the end of the second phase of the programme in 2021, the governments aims to have provided over 4 million upskilling learning experiences to students and teachers, including a significant proportion from groups underrepresented in STEM fields. CanCode officials are also looking into how to measure the long-term impacts of the programme, in particular, the numbers of trained students that enter STEM education and careers.

CanCode has also been particularly successful in terms of the diversity of participants. Originally focused on ensuring strong representation of girls and women in CanCode programming, the government has evaluated proposals to determine the ability to provide funding to other groups less likely to participate in digital training (e.g. youth with disabilities, youth in lower income households, Indigenous youth, etc.). The results have been very positive: nearly 45% of participants were girls, 1% were persons with disabilities, 7% were Indigenous youth, and 17% live in rural and remote locations where access to this type of programming is often limited.

55 www.canada.ca/en/innovation-science-economic-development/news/2019/09/cancode-program-project-breakdown.html.

At the individual level, several CanCode funding recipients provided feedback regarding the impact on educators who participated in the programme:

» "An educator with no STEM background attended our Regina digital literacy summit robotics workshop. Initially she felt it would be of no use and shared that quite vocally. Once she completed the workshop, she was absolutely thrilled and said she would immediately embed robotics in the curriculum." (Let's Talk Science)

» "The biggest surprise was the look of relief by teachers when they understood how to code. Many elementary teachers were fearful this would be something they did not have the ability to implement. Once we instructed teachers to define coding as a simple set of instructions, and understand computational thinking to be ordered steps, there was an audible sigh of relief." (Saskatoon Industry Education Council)

» "I had no idea that I could actually incorporate a simple coding activity in my class. It really doesn't matter what class you teach; you can incorporate fun coding activities in anything you do – even social sciences. In fact, I see coding brings people together." (First Robotics)

Challenges and lessons learned

The key challenges for CanCode have been related to timing. The first two cycles were established for two years, without any certainty that the programme would continue afterwards. This posed difficulties as upskilling efforts do not take root overnight; they require time to develop and refine. Significant time and dedication is also required to build the trust of students, teachers and other community members when starting a new programme. This is especially true when developing programmes for underrepresented groups, such as Indigenous communities, which were a particular target of CanCode. It also takes time to find new ways to engage and generate interest among underrepresented groups, such as girls, and to design programming that is responsive to their interests. By the time these efforts are complete, a cycle may be halfway complete. The short time window has also created challenges for collecting good data to demonstrate impact on the ground. Fortunately, the programme has been renewed once, and the CanCode team is hopeful that another cycle will be funded, which would help ease these challenges.

An additional challenge, as mentioned above, has been the situation created by the COVID-19 pandemic. CanCode providers have responded by offering more services virtually.

Replicability

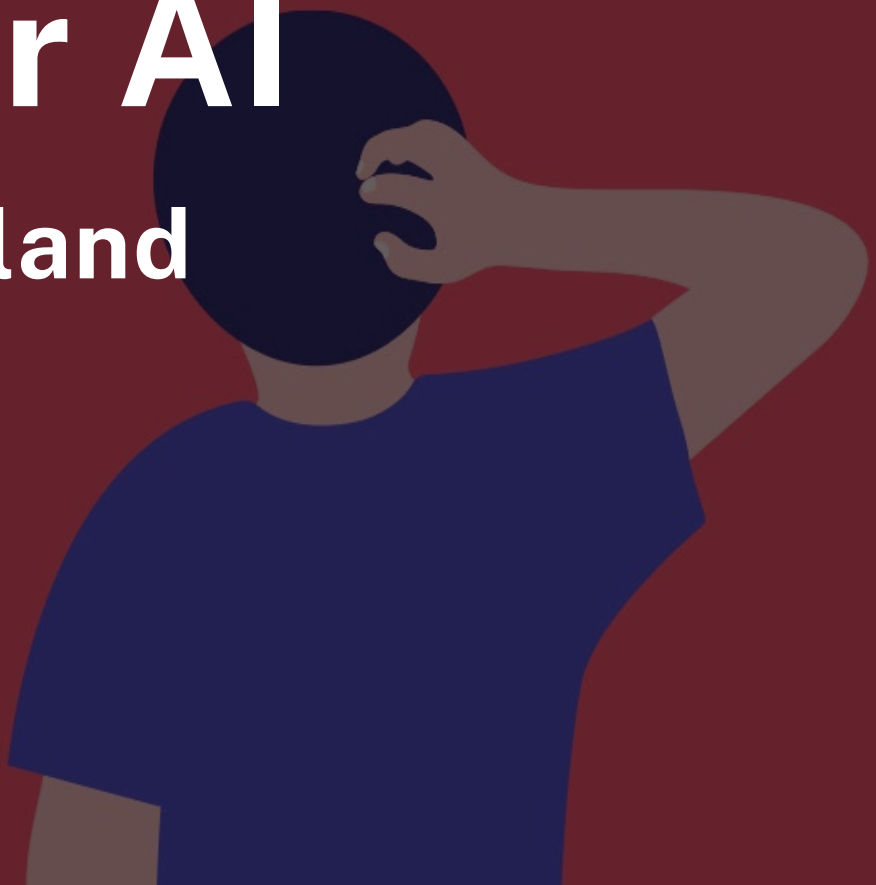
Digital skills are important for everyone. The CanCode team believes that the model and approach behind CanCode can be replicated by any government or organisation that wants to train members of the public in new skills and abilities. The team noted that other organisations interested in replicating CanCode must apply methods and approaches tailored to their own local context which meet the needs of underrepresented populations. While the overall structure of the programme is replicable, the content and substance as well as communication about the programme must be adapted to the unique context of each location.

blackboys code

KEY THEME 01: Case Study

Equalising the Potential for AI

Finland



"I am very impressed on the focus on AI in Finland and the training 1% of Finland's population in AI... it's a template which other countries can use."

– Sundar Pichaei, CEO, Google[56]

In recent years, Finland has been a trailblazer in the field of AI with applications in broader society, the economy and the public sector. To support its ambitious national AI strategy, the University of Helsinki partnered with private sector company Reaktor Education, with support from the Government of Finland, to develop and launch "Elements of AI",[57] a free and open online class with a curriculum devoted to AI concepts, their societal implications and the building of AI systems.[58] Unlike most AI courses, Elements of AI is designed to be broadly accessible and requires no previous technical skills. The launch of the initiative made waves when it announced a goal of training 1% of Finland's population. Having achieved this goal, it is now officially expanding across the European Union (though classes are open to anyone in the world), with translations to be made available in the 24 official EU languages, and a goal of training 1% of all European citizens. So far, 530 000 students from 170 countries have signed up for the course, with more than 40% of course participants being women (compared to the average of 15% for computer science courses), and 25% of applicants over the age of 45 (Reaktor, 2019).

The problem

Despite being a small country with a population of 5.5 million, Finland has declared its intention of becoming a world leader in the application of AI. The country is well positioned to achieve this goal due to a number of factors. Its citizens are highly educated, the economy is already technology intensive, the government has amassed a wealth of high-quality data and, after years of reform, its public sector is highly digitised and embraces experimentation and innovation. As touched on in the previous trends report on Seamless Government[59] and OPSI's report *Hello, World: Artificial intelligence and its use in the public sector*,[60] the country has launched what is perhaps the world's most extensive national AI vision and strategy focusing on the transformation of all sectors of the Finnish society and economy. If done well, not only could AI improve lives, enhance the functioning of government and make the country future-ready, research from consulting firm McKinsey indicates that accelerated development in AI and automation would result in a GDP increase of 3% per year and net employment gains of 5% (McKinsey & Company, 2017).

However, despite having a strong level of education, the Finnish population generally lacked a real understanding of AI, the skills to evaluate how it may affect them and how it can be applied. Although most people used AI in some way every day, general perceptions and the media tended to focus on the potential for AI to take jobs, or dystopian proclamations that AI would oppress humans. While technologists in the country understood that such views were exaggerated and that AI could bring real benefits, this was not the case for the general population. Many people were also susceptible to the more harmful aspects of AI, such as filter bubbles, manipulation and misinformation (OECD, 2019f). Moreover, while courses were available to further upskill tech-savvy citizens (e.g. further training people with basic programming skills), there was nothing on offer for the general public.[61] Finland's AI strategy recognised this gap and called for major upskilling among the population, with a strong emphasis on broad inclusivity, as opposed to efforts to further strengthen the skills and opportunities of experts in the field, as is often common among national AI strategies (OECD, 2019c).

56 https://elementsofai.com.

57 https://course.elementsofai.com.

58 Unless otherwise cited, the details for this case study were sourced from October 2020 interviews and correspondence with Teemu Roos, Professor of Computer Science at the University of Helsinki and Lead Instructor of Elements of AI; and Ville Valtonen, Managing Director of Reaktor Education. See https://soundcloud.com/oecd/finlandartificalintelligence for an OECD Podcast on Elements of AI with Teemu Roos.

59 See https://trends.oecd-opsi.org for all 2020 innovation trends reports.

60 https://oe.cd/helloworld.

61 https://eu2019.fi/en/presidency/elements-of-ai.

An innovative solution

To help overcome the reactionary and largely negative perceptions of AI, the University of Helsinki[62] partnered with the private sector digital education company Reaktor Education[63] to create "Elements of AI" – a free, university level Massive Open Online Course (MOOC) that seeks to increase AI literacy across the Finish population. Established with the backing and vocal support of the government, and an initial aim of reaching 1% of the Finnish population, "Elements of AI" aims to ensure that all citizens, including those without a technical background, have a basic understanding of the technology and its potential impacts, and are able to participate in informed discussions.[64] The course is unique in that it sets out to educate all groups, from those who are employed to the elderly, in basic AI, which it views as a "civic competence" (OECD, forthcoming a) that should be grasped by all.

The partnership is rooted in a coincidence – Reaktor had moved its offices to across the street from the University of Helsinki. The company had previously collaborated with academia and now sought to engage its new neighbour in undertaking a joint project. The university had recognised the existence of problems with AI skills, and Reaktor had come to realise from working with clients on AI solutions, that their customers did not really understand what they were buying, which required the company to continually educate people so that they could understand the basics of AI and its utility. Reaktor also wanted to give back to society and had previously been involved in upskilling school students with coding skills at no cost. The company and university pitched ideas and landed on the concept of an education programme called "AI MOOC", which evolved into Elements of AI. The partners worked together closely on a six-month intense development sprint to build and launch part one of the course, "Introduction to AI" in May 2018.

This course serves as an introduction to AI for non-experts, and is designed to be taken over a period of six weeks. However, participants can move at whatever pace they like. The course strives to communicate complex topics in digestible and easy-to-understand ways that allow non-technical members of the public to grasp the materials. Box 7 provides an example of explaining the complexity involved in developing AI systems with the capacity to make human-like actions.

Box 7: Picking up an object

"Look around and pick up an object in your hand, then think about what you did: you used your eyes to scan your surroundings, figured out where are some suitable objects for picking up, chose one of them and planned a trajectory for your hand to reach that one, then moved your hand by contracting various muscles in sequence and managed to squeeze the object with just the right amount of force to keep it between your fingers."

The ways that AI systems function are also broken down into similar approaches, which can sometimes achieve a specific task on their own, or be combined with other approaches.

Source: Elements of AI online course (https://course.elementsofai.com/1/1), OPSI.

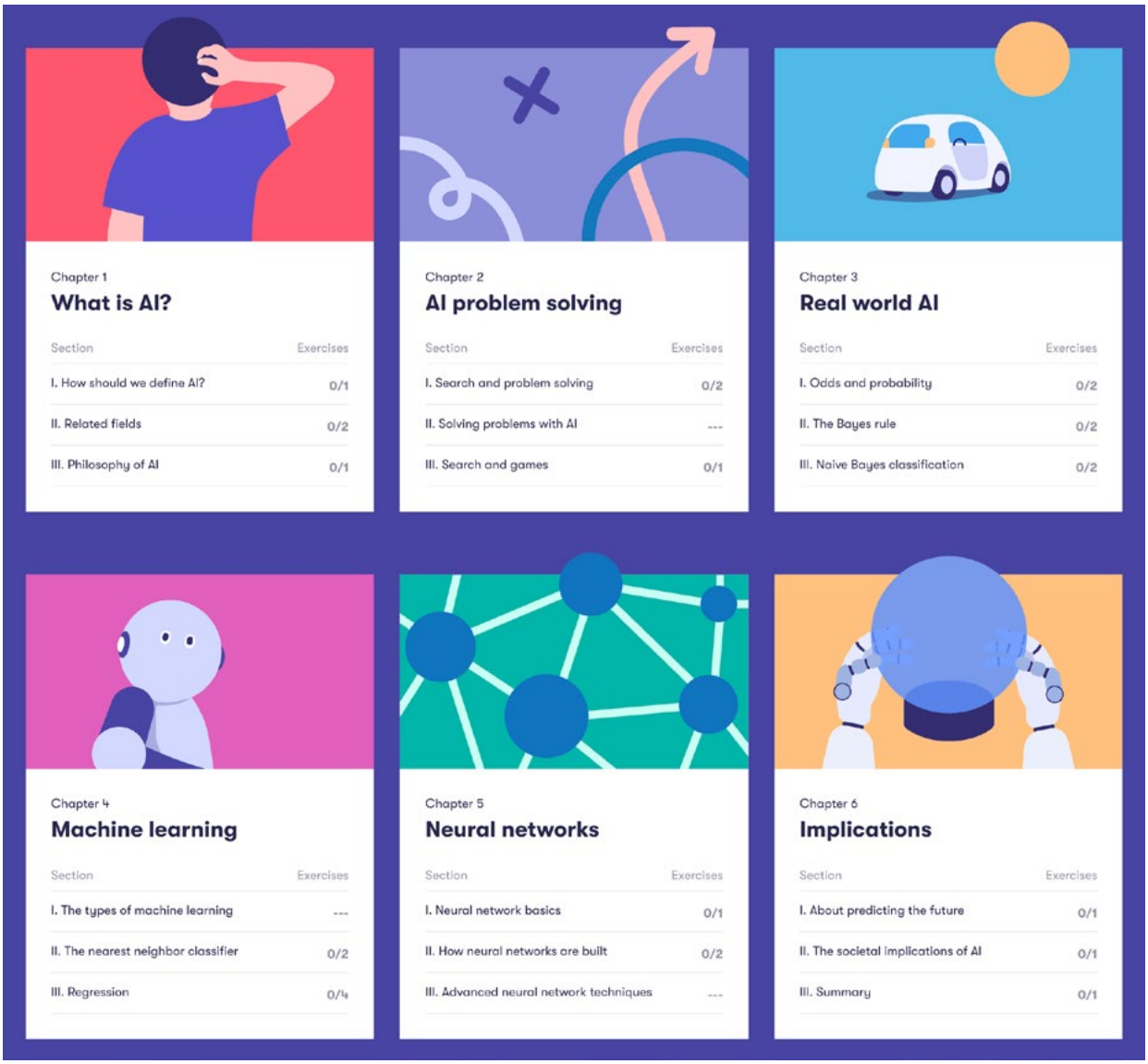
The course is designed to be modular and flexible, enabling programmes to grow over time based on user demand as well as evolution of the technology. It combines theory with practical exercises that can be performed at the participant's convenience. The first part, "Introduction to AI", helps participants to understand the nature of AI, what is and is not possible, and how it affects our lives – with no complicated maths or programming required (see Figure 7 for the course curriculum). Importantly, it also covers the societal implications of AI, such as data bias and the potential for algorithmic discrimination, and seeks to explain how to rectify these issues, as well as ways to help safeguard data (2019f).

62 www.helsinki.fi.

63 www.reaktor.com.

64 https://eu2019.fi/en/presidency/elements-of-ai.

Figure 7: Elements of AI course curriculum



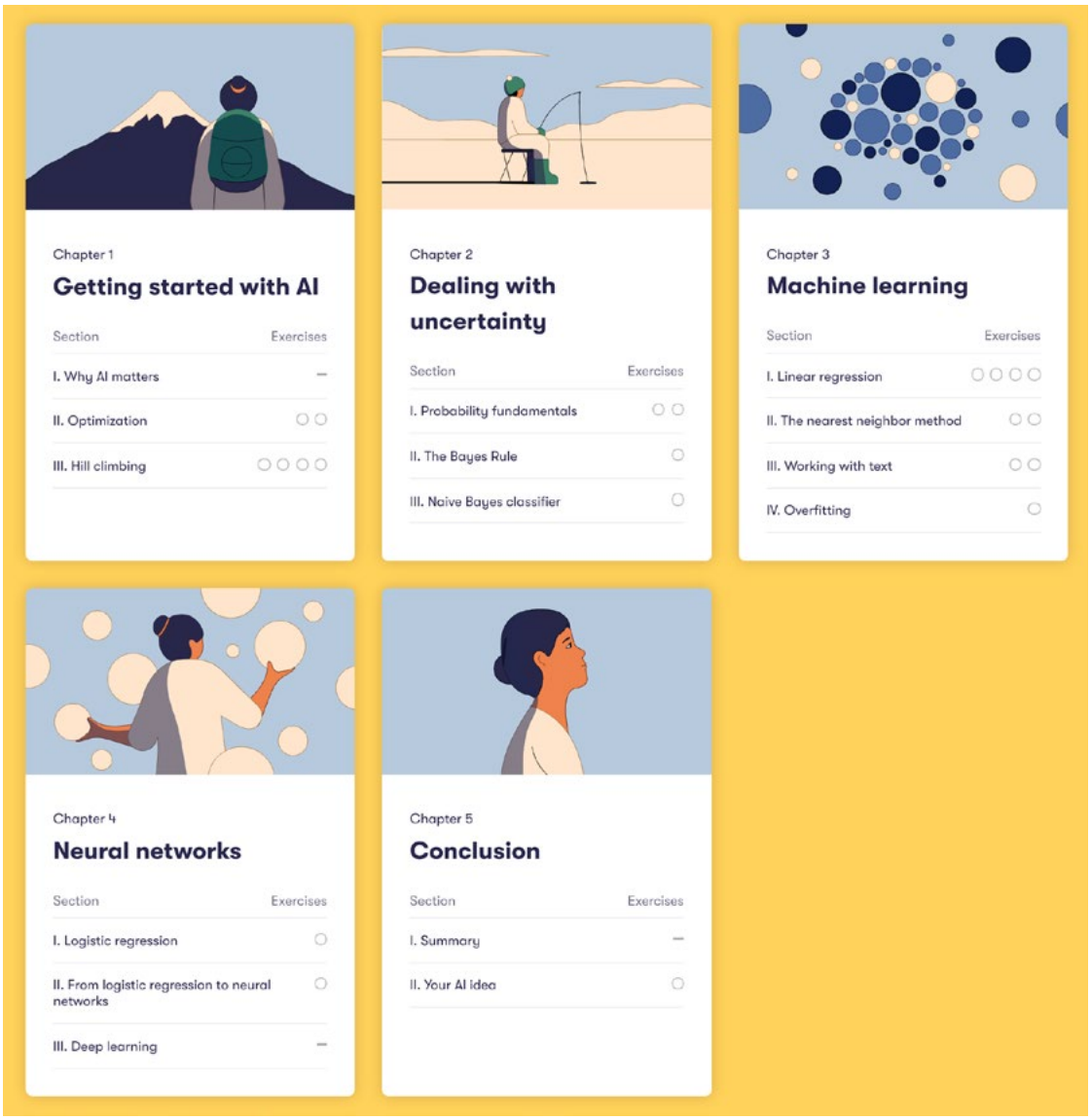
Source: https://course.elementsofai.com.

The second part of the course, "Building AI", launched recently at the end of October 2020.[65] Its curriculum (see Figure 8) allows students to dive deeper into the world of AI and learn about the algorithms that make the creation of its systems possible. Once students have been understood the basics from Part 1, they can also start to explore the basics of coding AI systems using the programming language Python. Building AI is still directed at the same non-technical audience, however. With each exercise, users will have the ability to choose from three levels of difficulty:

- Easy – No coding at all.
- Medium – students modify code that is already provided to them.
- Difficult – students write new code from scratch.

65 https://buildingai.elementsofai.com.

Figure 8: Building AI curriculum



Source: https://buildingai.elementsofai.com.

In their interview with OPSI, the project partners explained that the skills learned in the Building AI course enable people to join the AI community in concrete ways. Elements of AI is actively transforming AI consumers into AI contributors, enabling them to start innovating and using AI in creative ways that can have an impact. While still not as technically competent as AI developers, they would be able to manage teams where AI is applied and hold sophisticated conversations and undertake negotiations related to AI. The course thus helps to break down barriers.

Unlike many online courses, Elements of AI does not revolve around watching videos. In fact, there are no videos at all. Numerous peer-to-peer elements are baked into the programme's design, which help ensure its sustainability. The peer-to-peer elements also provide for a more robust set of learning methods to help students learn in applied ways, rather than through traditional methods such as multiple choice questions. Students not only learn new skills, they also become teachers of AI themselves. In order to successfully pass the course, each participant must provide peer feedback to other students on their responses to a series of exercises. For the most part, there are no clear "right" and "wrong" responses. Instead, the questions are designed to provoke critical thinking and generate viewpoints for discussion with other users. According to the project partners, this aspect has proven to be one of the most successful features of the course.

An equally important aspect of Elements of AI is ongoing marketing and dissemination, as well as other communications efforts, to promote user interest and engagement. Upon launch, the project partners organised an extensive marketing campaign, which included an "AI Challenge". The challenge encouraged Finnish companies to join the mission and train their staff in the basics of AI, with a view to achieving the 1% goal. Over 250 companies took part, including some of the largest companies in the country. Nokia, for instance, pledged to educate its entire workforce.

The government has also been a critical player in dissemination. Politicians and government figures have embraced the programme and promoted it both within Finland and internationally. In addition, the Elements of AI team have created an interactive community through the platform Spectrum,[66] which enables students to form study groups, share tips and ideas with each other, and connect directly with the Elements of AI team. Such active engagement through community building helps to empower people and has proven critical to the programme's success.

While the initial objective was to teach 1% of the Finnish population about AI, the course has already surpassed this aim and exceeded expectations. The Elements of AI team have now opened up the course worldwide to all interested parties, and are receiving thousands of new registrations every week. As a result of its success, Finland announced in late 2019, during its Presidency of the Council of the EU, that it would make Elements of AI freely available in all 24 official EU languages by early 2021, with translation effected by the European Commission.[67] The necessary investment, estimated at EUR 1.7 million,[68] is being implemented in collaboration with local universities throughout the European Union. Accordingly, Elements of AI has established an ambitious goal to educate 1% of all European citizens by the end of 2021. The course is now available in 12 languages, with 12 more coming before the end of January 2021, and has been launched in 13 countries, including Belgium, Estonia, France, Germany, Latvia, Norway and Sweden – in each case in the country's native language (Vanderkelen, 2020). Moreover, the open nature of the course allows any individual to participate if they speak one of the supported languages, regardless of where they are in the world. Reaktor Education is also supporting broader international upskilling efforts by working to develop three open online courses for the new European Digital Academy, mentioned earlier in this report. In addition, the University of Helsinki Department of Computer Science hosts a growing portfolio of other MOOCs (e.g. cybersecurity, introductory programming)[69] and recently opened its first-year studies to everyone.[70] The project partners are also considering other areas for expansion outside of Europe, such as in Africa (OECD, 2019f).[71]

Novelty

The main novelty in this case relates to the target demographic. The first step taken by the partners was to establish what they were building and for whom, and to identify what products were already out there. Through this research they identified numerous AI courses, but none aimed at the general public. All existing programmes targeted coders and people with a tech background. The partners then surveyed their friends and families to determine what people already knew of the subject and what they wanted to know, and used this information to map out the course curriculum. Once an initial curriculum was developed, they created a beta group with high-school students to ensure that the material was informative but also easy to understand. Each step was taken with non-technical users in mind, and the overall course was designed specifically to ensure that no one felt excluded by the approach or the material. In addition, the programme is intended to be fun and enjoyable – "like reading a good book", according to the project partners. Finally, Elements of AI is novel in its degree of openness and engagement. Two years in, Elements of AI is one of the biggest and most popular MOOCs in the world.

Results and impact

The Elements of AI course has been the most popular course in the history of the University of Helsinki (Pekkarinen, 2019). While the initial target was to train 1% of the Finnish population, the course has been taken up by over 100 000 participants, representing over 2% of the population and massively exceeding the initial goal (OECD, forthcoming a). Since its launched, there has been a 60% increase in the number of women who have applied to the university's computer science programme. At present, 30% of the computer science programme are women, with rates continuing to climb. While this trend cannot be wholly attributed to Elements of AI, it is likely that the programme has had a positive effect.

66 https://spectrum.chat/elementsofai.

67 See the promotional video by Reaktor Education at www.youtube.com/watch?v=I5jkF9lAICk.

68 https://eu2019.fi/en/presidency/elements-of-ai.

69 See www.mooc.fi.

70 https://eu2019.fi/en/presidency/elements-of-ai.

71 While not specifically related to digital skills, the University of Helsinki and Reaktor Education also launched in September 2020 the MOOC "Rethinking health: The fundamentals of value-based healthcare", with the aim of educating every healthcare professional in the benefits of value-based healthcare and to drive a grassroots revolution. The project partners have taken a similar approach to Elements of AI in terms of trying to educate as wide of an audience as possible. The course is available at https://reaktoreducation.com/en/courses/rethinkinghealth. Later this year, Reaktor Education will also be publishing a course on Viruses and Epidemics, which will give the public a broader perspective on viruses and epidemics such as COVID-19 work. An additional aim of the course is to combat scepticism about vaccines.

As noted earlier, the Elements of AI programme has spread worldwide: as of October 2020, 530 000 students from 170 countries have signed up for the course. Crucially, the initiative has managed to overcome challenging trends in technology fields demographics: more than 40% of the course participants are women (compared to the average of 15% for computer science courses), and 25% are over the age of 45 (Reaktor, 2019). The Elements of AI Spectrum platform has also given birth to an AI community, which has over 7 000 members. Participants appear to be very satisfied with the course, as Elements of AI is the highest ranked computer science course on the website Class Central.[72]

The project partners also told OPSI that the training is permeating other spheres. For instance, many companies are now using the course as a pre-requisite for corporate training sessions, as it provides a common baseline for all participants. Rather than training all personnel, who have different backgrounds and skills, the course allows everyone to start with the same strong foundation in AI. This allows corporate training sessions to go beyond their original parameters. Reaktor has also found that client maturity has increased greatly, leading to more productive discussions and development opportunities.

The project partners are also starting to explore the ways in which the programme has had an impact at the individual level. Although not yet published, preliminary results from a recent survey of Elements of AI graduates shows that a number of students have gone from being unemployed to obtaining employment after completing the course.[73] On this survey, graduates provided a variety of responses, including the following:

- "I got better knowledge on what effects on everything I do in Internet or with my mobile or tablet. Helps you to understand why I might be living in a bubble with my opinions."
- "It has opened my mind and enabled me to keep speculating and playing with ideas how I could use AI in my line of work in the future. Highly valuable insights."
- "After completing the course, I am able to hold discussion on the topic and understand the online research on the topic much better"
- "I'm no longer worried that AI may replace me, on the contrary I'm positive that it will help in routine tasks."

Challenges and lessons learned

In terms of lessons learned, aside from challenges related to developing the curriculum and implementing the course, project leads Teemu Roos and Ville Valtonen stressed the importance of engagement and dissemination activities. It is critical to attract a large and diverse user base. Approaches such as organising an AI Challenge (discussed earlier), national launch events, and other forms of engagement and outreach with potential implementation partners and other stakeholders play a crucial role in this regard. Simply publishing content online and expecting to attract an audience is not sufficient; a significant investment in time and energy is necessary to interest and motivate people to become involved. The partners encouraged interest and growth by promoting study groups, organising meetings and holding special sessions for specific groups (e.g. Women in AI,[74] public libraries) to demonstrate how the programme aligned with their interests. As Teemu Roos told OPSI, "You need to make it a movement".

The project partners also stressed the value of real collaboration. The cooperation between the University of Helsinki and Reaktor involved working closely together, in depth over a long period of time. All data were shared and each partner had an equal say in all aspects of the project from the initial concept through to curriculum design. Such mutual trust takes time to build, but is vital in order to drive the collaboration and achieve an optimal result.

72 See www.classcentral.com/subject/cs?sort=rating-up.

73 The survey was conducted between November 2019 and March 2020. It was sent to all students who had recently undertaken the course as part of the University of Helsinki's Flexible Study Modules in Software Engineering and ICT (FMSEI) project funded by the Finnish Minister of Education and Culture. Of the 1 011 responses, about 85% completed only the Elements of AI course, about 11% completed Elements of AI plus one or more other online courses, and the rest completed other courses but not Elements of AI.

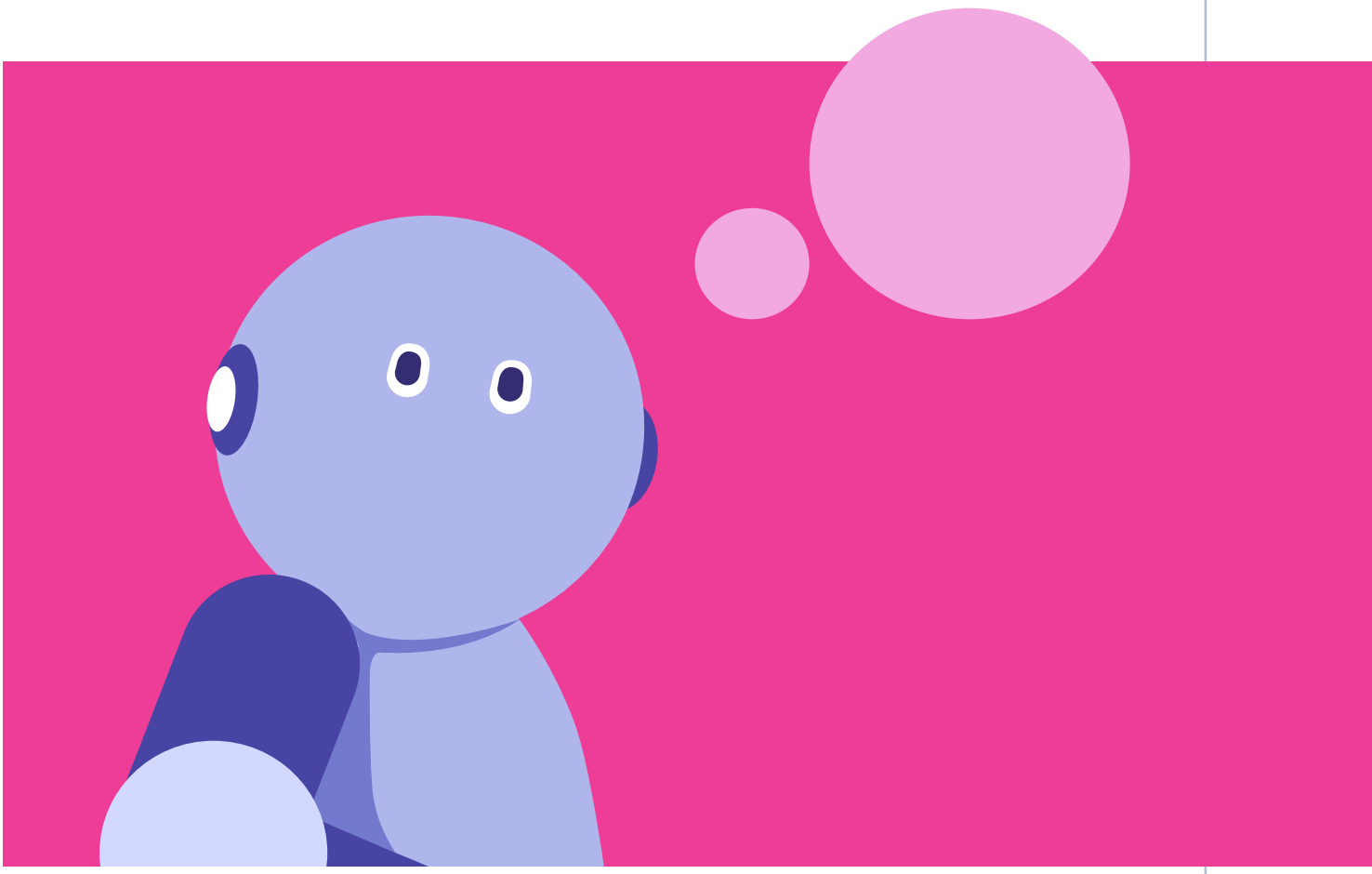
74 See www.womeninai.co and www.ai.se/en/news/women-ai-and-ai-sweden-start-free-ai-crash-course.

In terms of success factors, support from the government has been critical. Even though the programme was developed and made available as a free resource, people remained sceptical. Clear, consistent, continuous support from the government, and later the European Union, helped to overcome this reaction and convince cautious potential participants that there was no hidden agenda. This was essential in order to gain user adoption, especially in the early stages. Government support, including that of the President of Finland, who personally announced the first graduates, also helped to make Elements of AI a truly national programme, which was accepted beyond the walls of academia and the private sector.

Replicability

Elements of AI has already demonstrated significant capacity for replication. The initial course offering in Finland, in English, is now available to interested parties anywhere in the world, in 12 languages. To help make the course even more accessible, the Elements of AI team is seeking partners abroad, such as universities and companies, to help bring the course to new locations. Such partnerships would help cover costs and offer useful advice on linguistic and other practical considerations.[75]

Besides expanding the Elements of AI programme, the general concepts of a MOOC for educating the public on AI are broadly applicable in any country. At least 50 countries have developed national AI strategies, and most include a focus on upskilling (OECD, 2019c). Such an initiative could bolster implementation of these efforts. The contents of the Elements of AI course, however, are copyright protected, so any government wishing to create their own MOOC would need to generate their own curriculum and course materials. However, the project partners are very open to collaboration with others and encourage governments to create new courses for the general public.



75 Organisations interested in partnering with Elements of AI to present the course can e-mail elementsofai@reaktor.com.

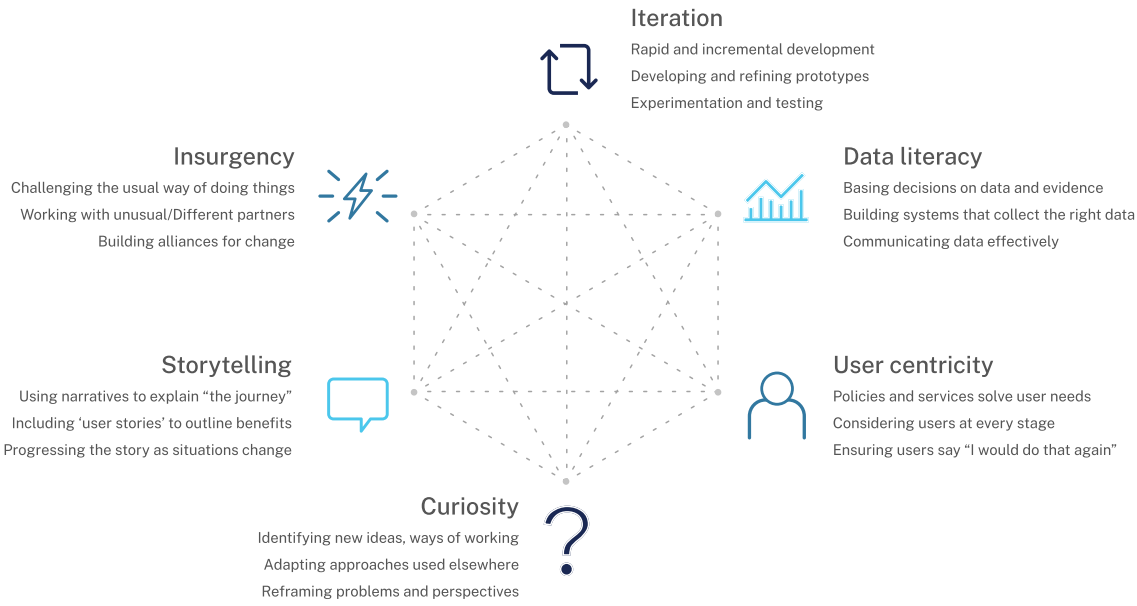
KEY THEME 02

Upskilling the public service to unlock the potential of government

Public employees represent a significant proportion of the broader population (18% across the OECD on average) (OECD, 2019d), and ensuring the public service has access to the right set of skills is critical to a well-functioning government. OPSI and the MBRCGI strive to encourage novel approaches to address society's complex problems by empowering public servants with new insights, knowledge, tools and connections to help them explore emerging possibilities. The foundation of this approach is the skills of civil servants and public leaders in government and their partners in industry and civil society. This is recognised by all OECD countries, and a number of others, through adherence to the 2019 Recommendation on Public Service Leadership and Capability,[76] which states that a professional, capable and responsive public service is a fundamental driver of citizens' trust in public institutions. Building on this recommendation, the OECD Public Employment and Management Unit (PEM) will shortly issue a report on the future of work in the public service, addressing the urgent need to make the public service more forward looking in terms of skills and workforce planning, flexible both structurally and in terms of assembling talent in new ways, and fulfilling to an increasing range of employees, for example by keeping them engaged through continuous growth and opportunities to exchange ideas.[77] A number of governments are leveraging innovation to ensure they have the right foundations, processes and, most importantly, people in place to secure the future of work.

The need for innovation is a key principle of the OECD Recommendation – "building a proactive and innovative public service that takes a long-term perspective in the design and implementation of public policies and services". In seeking to actualise this objective and international commitment, OPSI and its colleagues in PEM have been working closely with governments to promote their innovation efforts through the Core Skills for Public Sector Innovation (Figure 9).[78] Not all public servants will need to make use of or apply these skills in their day-to-day job. However, all officials in a modern public service should possess at least some level of awareness of these six areas in order to support increased levels of innovation.

Figure 9: Six core skills for public sector innovation



Source: https://oe.cd/innovationskills.

76 See https://oe.cd/pem-rec. An official OECD "Recommendation" is a legal instrument which, although not legally binding, is considered by member countries to carry great moral force. OECD Recommendations are adopted when member countries are prepared to make the political commitment necessary to implement the principles set out in the text. This type of instrument is often referred to as "soft law".

77 See www.oecd.org/employment/pem for details on PEM's work including the upcoming report on the future of work.

78 https://oe.cd/innovation-skills.

In October 2020, OPSI undertook a survey of OECD member and partner countries (OECD, 2020 forthcoming)[79] to further refine public service skills needs. Preliminary findings from this survey suggest four clusters of innovation skills that are becoming more important and require increasing levels of attention:

- **Digital skills**, including user centricity, a continuously renewed capacity to use and govern emerging technologies, and data skills spanning analytics, data management and governance.
- **Boundary-spanning skills**, a set of skills and experience to foster collaboration across sectors and professional domains.
- **Emotional intelligence**, empathy and conflict management.
- **Anticipatory, complex problem solving** and ongoing learning and change management.

There is a natural relationship between these clusters. The expansion of intentional collaboration and anticipatory problem solving means engaging regularly with a wider set of unfamiliar perspectives, balancing competing interests and maintaining multiple relationships. Emotional intelligence and a tolerance for ambiguity, in turn, represent the soft skills that underpin these approaches and are often woven through different subjects. Empathy as a soft skill likewise supports user centricity. Interestingly, a slightly less-reported sub-theme is the time investment required by complex, multi-stakeholder environments. Time management was also cited by multiple countries as a skillset of increasing importance. Accordingly, the skillsets waning in importance focus on traditional policy analysis approaches and specialisation in singular, specific fields. These responses align with but also slightly refine the Core Skills for Public Innovation above.

Bringing about these types of skills is a difficult task and, in general, public sector workforces are lagging behind in terms of skills and capacities that promote and enable innovation. A recent report by ANZSOG, the NYU's Governance Lab and the Monash Sustainable Development Institute (ANZSOG, 2019), which built on a survey of hundreds of public servants in Australia and New Zealand, involving research into innovation skills training efforts in governments worldwide, found that "public servants are eager to embrace skills for innovation but receive inadequate training in them … creating … a creeping crisis for the public sector." Despite the challenges ahead, many of the efforts uncovered through the 2020 Global Trends focus on upskilling public servants for the 21st century, with observed sub-themes discussed in this section. A number of these are directly relevant to the skills needs identified by OPSI's preliminary survey results, and OPSI will be building on them through research and analysis over the coming months.[80]

Fostering and combining skills that promote innovation

The topic of innovation can be broad and difficult to grasp. While perhaps not yet as common as initiatives aimed at promoting digital skills, which themselves support innovation, some governments have developed training programmes aimed at encouraging the curiosity, know-how, mindsets, culture and behaviours necessary to help innovation flourish.

Such efforts range from the broad and sweeping to the very targeted. In an example of the former, Ireland launched its first ever public service-wide innovation week in December 2019. Public service bodies across the country developed over 200 events and activities to spotlight innovation,[81] with an emphasis on equipping teams with innovation skills. Brazil has launched a similar innovation week and is seeking to build innovation skills ecosystems across government and with other sectors. The Government of Brazil has also demonstrated its intent to enhance innovation through an in-depth review of its innovation skills and capacities, with a specific focus on leaders, as documented in the OECD report *Innovation Skills and Leadership in Brazil's Public Sector* (OECD, 2019e).[82]

79 This survey was administered by OPSI through its Network of National Contact Points (NCPs). See https://oe.cd/ncps for more information on this network.

80 The topic of Anticipatory Innovation was discussed in-depth in the 2020 Global Trends report on Seamless Government (https://oe.cd/seamless-gov).

81 See https://oecd-opsi.org/innovations/ie-innovation-week and www.ops2020.gov.ie/actions/innovating-for-our-future/innovation/innovation-week.

82 https://oe.cd/br-innovation-skills.

A more targeted albeit still comprehensive innovation training programmes is the Government of Australia's new "Innovation(ish)" initiative which, consistent with the OECD Declaration on Public Sector Innovation,[83] affirms that *everyone* in the public service can be an innovator and contribute in some manner (see Box 8).

Box 8: Innovation(ish) – Australia Department of Foreign Affairs and Trade (DFAT)

The Department of Foreign Affairs and Trade (DFAT), in collaboration with other agencies, has identified knowledge and capability gaps across its sector of government in the area of innovation. To fill these gaps, DFAT partnered with People Rocket (a company comprising faculty from the universities of Sanford and Harvard) to pilot a fully virtual training and capability programme, *Innovation(ish)*.

The programme has a strong focus on shifting mindsets and developing "cultures that champion innovation through cross-functional collaboration", in addition to providing techniques and methods for innovation practice. It provides a framework that participants can use to more easily explore their own work practices, regardless of context and incrementally add new value/innovations to their work. The *Innovation(ish)* pilot is delivered in three contrasting modalities: as a 14-weekly session stream, a half-day accelerated workshop, an 8-weekly session stream and a 2-day bootcamp stream. Each modality is designed around 14 learning contact hours.

To ensure the initiative is scalable, the pilot is delivered to a large number of public officials participating as project team members (and not individuals). It also designates a smaller number of official as innovation coaches through a tailored train-the-trainer curriculum, in order to embed innovation capabilities within the department. The Department has further commissioned a research report to measure the effectiveness of the *Innovation(ish)* pilot.

Innovation(ish) can serve as an example of how innovation triggers what OPSI refers to as "innovation antibodies" – individuals or groups that seek to block innovation and perpetuate the status quo. However, despite critical press from media outlets such as *The Guardian*, which referred to the training as a "management fad", OPSI and the MBRCGI have found that the underlying principles are sound and worth exploring.

Source: www.theguardian.com/australia-news/2020/jul/12/innovationish-training-australian-government-spends-230000-on-latest-management-fad *and* https://oecd-opsi.org/wp-content/uploads/2019/05/implementation-with-EC-cover-1.pdf, *DFAT.*

The Government of Canada has taken a more hands-on approach to promoting such skills. Its "Experimentation Works" (EW) initiative[84] builds public servants' capacity in experimentation skills and practice through a unique learning-by-doing model designed to support and showcase small-scale experiments ran by and for public servants.[85] EW seeks to generate practical examples of experiments and ensure open access to learning materials, progress updates and results for broad impact. It works by connecting project teams with each other and with experts through an open-by-default "cohort model". By showcasing and supporting department-led experiments from start to finish, EW seeks to build capacity and practical understanding related to the value and process of experimentation, while generating new examples of federal experiments and ensuring open access to related learning modules, progress updates and results for broad impact. EW's second cohort of experiments just began in September 2020.[86]

Efforts are also underway at the sub-national level. In Bogotá, Colombia's LAB Capital has developed an online course on public sector innovation for public officials, which seeks to help civil servants gain insights into innovating on policies and services from a user-centred perspective, as well as foster an ecosystem of innovators among public offices.[87]

The State of New Jersey in the United States has developed an Innovation Skills Accelerator as a free, online programme to train public entrepreneurs to use innovative methods, including design thinking, evidence-based decision making and collective intelligence, to solve public problems.[88] While most efforts still seem to be national, the growing number of sub-national initiatives can help address specific contexts and needs for public service skills in these areas.

83 https://oecd-opsi.org/projects/innovationdeclaration-2.

84 See https://oecd-opsi.org/innovations/experimentation-works-ew and https://medium.com/@exp_works.

85 Efforts are tracked and discussed in the open at https://trello.com/b/9OKR93f5.

86 See https://link.medium.com/LJS9lgDZfab.

87 https://oecd-opsi.org/innovations/online-public-innovation-course-for-public-officials-labcapital.

88 https://skills.innovation.nj.gov.

While the 42 national adherents to the OECD Declaration on Public Sector Innovation have committed to "encourage and equip all public servants to innovate", many efforts recognise that not *every* public servant can be an expert in *every* innovation skill. Thus, governments have devised innovative ways to bring skillsets together in multi-disciplinary environments to achieve an optimal skills composition.[89] OPSI research[90] has shown that multi-disciplinarity is one of the most critical factors for the success of innovation projects (OECD, 2019c). OECD countries are increasingly recognising the important contribution of multi-disciplinary teams to innovation in the public sector, with most OECD governments now experimenting with the use of such teams to tap into the innovation potential of their workforce (OECD, 2017b). The French government has emphasised this through their Manifesto for Public Sector Innovation,[91] which states that a "multidisciplinary approach can ensure smart decision-making, rather than viewing problems through the lens of a single method". In practice, this can be manifested in several ways. Australia's Data61 provides a successful example in this field combining skills from the public sector with those from other sectors (see Box 9). Fostering multi-disciplinarity in skillsets also relates to the development of innovative initiatives to promote skills exchange, as discussed later in this report. Such efforts focus on diffusing skills and mindsets, whereas the efforts discussed here refer to assembling an optimal balance of skillsets to achieve collective goals. However, one may have positive spill over effects on the other.

Box 9: Multi-disciplinarity at Australia's Data61

Data61 was formed as a data innovation network with "porous boundaries" that would allow multi-disciplinary members of the network from various backgrounds to lend their expertise to different projects and programmes, including those related to AI. In an interview with *The Mandarin*, Data61 CEO Adrian Turner stated that with such a model, the organisation "would be able to tackle larger-scale, multi-disciplinary work in a way that we couldn't if it was just us and our employees".

Through collaboration agreements, Data61 has become a combined network consisting of 1 100 individuals, including experts from 32 universities, as well as the civil servants at Data61. In the interview, Turner "stresses that raw technical capabilities must be combined with domain-expertise in whatever sector they are applied, such as government, health, or agriculture".

Source: www.themandarin.com.au/112035-license-to-operate-differently-%E2%80%95-how-data61-achieves-large-scale-digital-innovation-with-porous-boundaries-and-multi-disciplinary-teams.

A growing concept in innovation – somewhat related to the concept of governments assembling multi-disciplinary teams – is the promotion of skills that help individuals become "boundary spanners". Such individuals have the ability to advance innovation by navigating boundaries and siloes within and across government, and with other sectors (Dickinson et al., 2019). Such activities assume increasing importance as the challenges governments face grow in terms of volume and complexity, exceeding the capabilities of traditional government structures (van Meerkerk and Edelenbos, 2018). Boundary spanners have the capability to identify gaps in knowledge, skills and abilities, and work across structures to fill them through communication, collaboration and building trust (Torfing, 2019). Such individual initiative can help address longstanding issues of siloed and hierarchical government by meeting difficult structural reforms halfway. Chile's #YosoyI is an innovative programme that seeks to build this capacity in government (see Box 10).

89 Multi-disciplinary refers to having different skillsets as a result of different educational background, professional experiences and so on. While not related specifically to the topics of "skills", diversity and inclusivity in teams (e.g. different genders, races, ages, socioeconomic backgrounds, etc.) is also a critical foundational and cross-cutting enabler for public sector innovation. As with multi-disciplinarity, diversity and inclusiveness should be an important consideration throughout the full process of considering, designing, developing and implementing innovation initiatives. This can be especially important in the development of AI systems, as discussed in OPSI's report *Hello, World: Artificial Intelligence and its Use in the Public Sector* (https://oe.cd/helloworld).

90 http://trends2019.oecd-opsi.org.

91 www.modernisation.gouv.fr/sites/default/files/french_manifesto_for_public_sector_innovation.pdf.

Box 10: #YosoyI (Chile)

Chile's agency to promote economic growth, the Production Development Corporation (CORFO), has developed the #YoSoyI (I am I), which seeks to overcome the problems created by public servants working in siloes, without the skills and incentives to collaborate. Modelled after the behaviour of bees, the model aims to "germinate" efforts across the organisation through "cross-pollination". #YoSoyI trains employees to be "pollinators" teaching them the skills to break through silos and work across boundaries and promote collaboration. It provides for co-creation spaces to help promote and house the collaborative efforts co-ordinated by the pollinators. Over the long term, #YoSoyI seeks to foster a sustainable culture for collaboration and innovation. See https://youtu.be/XcWUvYesAX4 for an overview video submitted by CORFO as part of its Call for Innovations submission (in Spanish).

Source: Government of Chile through the OPSI Call for Innovations.

In general, there is little systemic knowledge on boundary spanning in government (van Meerkerk and Edelenbos, 2018). Some of the strongest work in this field has developed by Paul Williams (2012), who mapped the functioning of boundary spanners in public networks, and identified four roles, each with its own competencies (see Table 1). The Centre for Public Impact (CPI)'s Theo Snow, has also helped to advance this area by articulating seven key skills needed by government boundary scanners (Box 11), which OPSI endorses as consistent with its work and observations.

Table 1. The role and competencies of boundary spanners in public administration

Role	Activities	Main competencies
Reticulist	Informational intermediary, gatekeeper, entrepreneur of power	Networking, political sensitivity, diplomacy, bargaining, negotiation, persuasion
Interpreter/ Communicator	Culture breaker, frame articulator	Interpersonal, listening, empathising, communication, sensemaking, trust building, conflict management
Co-ordinator	Liaison person, organiser	Planning, co-ordination, servicing, administration, information management, monitoring, communication
Entrepreneur	Initiator, broker, catalyst	Brokering, innovation, whole systems thinking, flexibility, lateral thinking, opportunistic

Source: Williams (2012); www.oecd-ilibrary.org/governance/skills-for-a-high-performing-civil-service_9789264280724-en.

Box 11: Seven skills needed to be an effective boundary spanner

1. **Relationship building:** The ability to build authentic and sustainable relationships with a diverse range of actors based on trust and mutual respect.
2. **Communication skills:** The ability to listen, filter and translate information across parties who are not used to working together.
3. **Chutzpah:** Willingness to challenge the rules that hold people back from successful collaborations.
4. **Empathy:** The ability to stand in someone else's shoes and understand their point of view.
5. **Creativity:** The ability to embrace new ideas and ways of doing things.
6. **Diplomacy:** The ability to negotiate and broker agreements while being seen as objective.
7. **Ability to manage complexity:** The ability to be comfortable with managing collaborative efforts that are complex – including the ability to see and comprehend the whole system.

Source: Thea Snow, https://apolitical.co/en/solution_article/here-are-the-7-skills-you-need-to-collaborate-in-government.

As with many innovative approaches, however, bringing about these skills and fostering boundary spanning is easier said than done. Many government systems work against genuine boundary spanners. Complex value trade-offs, accountability issues, and knowledge management and general mindsets can all serve as obstacles. The OECD PEM team recently issued a report (Gerson, 2020)[92] examining these issues through the lens of a case study in the Netherlands, whose public service excels in this area. The report provided several insights into approaches that help public officials balance these tensions:

1. **See the bigger picture.** Being a societal partner requires a new mindset – thinking in terms of "what is good for society", and addressing problems from a holistic point of view, rather than purely a sectoral one.

2. **Set clear boundaries and manage expectations.** Interviewees reported that building trust comes from being transparent about the extent of an individual's influence. In some instances, framework or umbrella agreements were established as a baseline or foundation for continuing activities.

3. **Exchange ideas and ask for help.** While these challenges may seem context-specific, much can be learnt from the insights of others in forums, such as groups with access to new areas.

While some government efforts naturally help encourage some of these skills (see the knowledge-transfer section later in the report), OPSI and the MBRCGI believe that additional and explicit programmes centred on boundary-spanning skills could help provide a solid foundation for innovation in government.

For governments seeking to enhance innovation skills in the public sector, OPSI's Core Skills for Public Sector Innovation[93] provide a maturity matrix that breaks down each skill into tangible components related to their real-world usage. This can help governments understand their current capacity for innovation skills and plot a course for growth. In addition to this framework, other organisations have also developed tools and resources. Nesta, for example, has developed a handy Competency Framework for Experimenting and Public Problem Solving[94] and an associated implementation toolkit,[95] with pillars built around working together, accelerating learning and leading change. The Governance Lab (GovLab) based at NYU has developed a list of 10 recommendations for public sector innovation skills, based in part on OECD research.[96] Other resources for innovation skills include Nesta's "Playbook for Innovation Learning", Pixar's "22 Rules of Storytelling" and the Social Innovation Community's "Leaning Repository". These and many other resources can be found on OPSI's Toolkit Navigator.[97]

92 See Leadership for a High Performing Civil Service: Towards senior civil service systems in OECD countries at *www.oecd-ilibrary.org/governance/leadership-for-a-high-performing-civil-service_ed8235c8-en*. This report also examines the related concept of networked collaboration in Finland.

93 *https://oecd-opsi.org/projects/innovation-skills.*

94 *www.nesta.org.uk/toolkit/skills-attitudes-and-behaviours-fuel-public-innovation.*

95 *https://media.nesta.org.uk/documents/Nesta_CompetencyFramework_Guide_July2019.pdf.*

96 See *http://thegovlab.org/govlab-how-to-train-and-teach-for-21st-century-public-leadership.*

97 *https://oe.cd/toolkit.*

Infusing government with new skills for the digital age

In addition to broader innovation skills, many governments have focused on bringing digital skills into the public service and promoting them among civil servants. This was also raised as a priority area in OPSI's 2020 survey. Digital approaches to designing and developing public policies and services constitute a critical foundation for transforming a country and ensuring government can keep up with public expectations. OECD research further shows that this has a significant bearing on citizen wellbeing (Welby, 2019). To achieve this goal, governments must evolve digital-by-design cultures and transform the behaviours of public sector bodies, which means providing these organisations and their employees with access to the right skills.

In many ways, the profound impact of digital transformation in the private sector is only just manifesting to a significant degree in the public sector, in terms of comparable yet early changes in policy making, service design or government-citizen interaction, with countries demonstrating differing levels of maturity in this area. The OECD's recently issued Digital Government Policy Framework (DGPF) (OECD, 2020) and its associated Digital Government Index identify and measure a number of key dimensions that characterise a fully digital government, such as digital by design, data-driven, proactive and user-driven. However, the ability for government to harness modern skills and capacities underpins each of these dimensions, demanding that governments find ways to integrate new skills into government, while enhancing the skills of those who already serve. The COVID-19 crisis further emphasises this need, the first report in the Global Trends 2020 series[98] identifying a "rapid acceleration of digital innovation and transformation" as a key response, with digital skills a necessary component for keeping up and shifting to these new environments and ways of working.

Given the critical and foundational nature of digital skills in the public service, the OECD Digital Government and Data Unit, in co-ordination with OPSI and PEM, is drafting a new digital skills and talent framework for the public service. The aim is to shift from a sole focus on technology towards a mindset and culture, supported by technical skills, capable of designing government services that are more open, collaborative, inclusive, innovative and sustainable (OECD, forthcoming b).[99] While research to identify the most important factors is still underway, and thus still in flux, some early findings are starting to take shape. Preliminary observations show that environmental factors such as leadership, organisational structures, learning cultures, and working practices and tools provide an important setting that can make or break progress in digital skills and maturity. In terms of specifics on skills, preliminary findings show that modern digital skills include understanding users and their needs, collaborating openly for iterative delivery, using data and technology in a trustworthy way, recognising the potential of digital approaches to transform services to be more responsive to public needs, and ensuring civil servants have the necessary socio-emotional skills to collaborate in multi-disciplinary and diverse teams. More details on this framework are expected in 2021. Other organisations are also seeking to define key 21st century digital skills for public servants, including a group of international academics and practitioners who formed the community "Teaching Public Service in the Digital Age", which has defined eight core competencies (Box 12).

98 https://oe.cd/c19-innovation.

99 OECD efforts to support governments in achieving digital transformation, including through the development of digital skills, are led by its Digital Government and Data Unit (https://oe.cd/diggov) in co-ordination with the OECD Working Party of Senior Digital Government Officials (E-Leaders) (https://oe.cd/eldrs). This work is guided by the OECD Recommendation on Digital Government Strategies (https://oe.cd/diggovstrategies). OPSI and the Digital Government and Data Unit work in partnership on efforts where digital and innovation intersect.

Box 12: Teaching Public Service in the Digital Age (core competencies)

1. Values the experience of service users, and can collaborate with specialists to understand user needs, then design, test and adopt effective solutions.
2. Can anticipate and mitigate the privacy, security and ethical risks that are inherent to governing in a digital era.
3. Understands the need to blend traditional public service skills with modern, digital skills, and can effectively work within and lead multidisciplinary teams.
4. Understands the importance of iteration and rapid feedback loops, and can create a working environment that can continuously learn and improve outcomes.
5. Can identify the opportunities to improve government operations, service delivery or policy making, and can overcome structural and institutional obstacles to change.
6. Can use a range of techniques and tools to make government more open, collaborative and accountable.
7. Understands how to use data to inform decisions, design and run services, and create public value inside and outside government.
8. Understands the current and evolving affordances of digital technologies and can assess how they can be used to improve public outcomes.

Source: www.teachingpublicservice.digital/competencies.

Governments have put in place a number of innovative initiatives to help build supportive structures and infuse the public sector with the right skills to adapt to the modern era. Australia, for example, is taking a structural approach by building "digital career pathways" and organising a series of workshops to define the roles within them (Easton, 2019a). Italy has developed "Digital Skills for the Public Administration", an initiative that aims to consolidate common digital skills for all public employees by implementing gap detection and structured training (European Commission, 2019; OECD, forthcoming b). A common theme at the national level is the development of cutting-edge schools and academies. These can provide structural support and introduce specific skills and mindsets with the potential to affect whole-of-government change. Examples of these institutions include the following:

» The "Digital Lithuania Academy" (DLA)[100] is an online learning platform that seeks to immerse public officials in digital practices by 1) measuring their digital skills via diagnostic testing, 2) providing personalised learning pathways tailored to each public official's career development, and 3) exposing public officials to practical use-cases of digital technology and their application in the public sector.

» The United Kingdom's "Data Science Campus"[101] forms part of the Office for National Statistics and operates at the frontier of data science and AI, delivering research and enhancing capabilities across the public sector. It focuses on building skills and applying tools, methods and practices to create insights for improving decision making for the public good. The United Kingdom also has a Government Digital Service (GDS) Academy, which is one of the first global efforts to provide online training for public officials.[102]

» The Government of Canada has created a Digital Academy[103] to ensure its public service is prepared for the digital age. It includes a well-rounded curriculum on topics such as data, agile approaches, the cloud, cybersecurity and emerging topics. It includes training for leaders, including workshops where they can learn about emerging skills in the population and what they can do to support this process. This is important, as research shows that interac tions between leaders and the workforce represent a major contributor to productivity.[104] The Academy also seeks to change mindsets by bring together partners from different sectors to collaborate and share knowledge and experiences. It has also developed a series of "Busrides", bite-sized podcasts designed to keep public officials engaged.

100 https://oecd-opsi.org/innovations/dla.

101 https://oecd-opsi.org/innovations/data-science-campus

102 www.gov.uk/government/collections/gds-academy-course-descriptions.

103 www.csps-efpc.gc.ca/digital-academy.

104 https://ic-space.gcs.civilservice.gov.uk/get-your-leaders-engaging/evidence-to-make-the-case.

These efforts focus on concrete technical skills, such as data analysis, as well as critical design and project management skills crucial for success in digital government. One such programme, the Government of Australia's BizLab, kindly provided OPSI with its full Human Centred Design curriculum, including editable source files, which OPSI has made available on its Toolkit Navigator.[105] Digital skills linked to human-centred and user-centred design are of particular importance. Governments must possess a strong understanding of the needs of citizens, residents, businesses, civil servants and anyone else who may interact with, or be impacted by, government policies and services. Unless they engage with potential users (both inside and outside government), public officials will not be able to be determine accurately which problems exist and whether a potential policy or service will satisfy core needs.

Many innovative efforts are also taking place at the local level. One of the most expansive efforts comes from the United States, where Bloomberg Philanthropies' "What Works Cities" programme has provided a significant body of practice[106] focused on partnering with local governments to use data and evidence to improve decision making. The What Works Cities Academy includes relevant online courses, sprints and training,[107] and its Certification programme works to measure, compare and promote the skills of local government employees.[108]

OPSI and the MBRCGI expect government efforts to grow in this area as they identify current skills needs and seek to address them through upskilling initiatives. However, governments do not necessarily have to bear the full burden of upskilling and in-skilling the civil service. A number of organisations have developed programmes to help promote innovation in government. Apolitical, a learning platform for government, has developed a five-week "Data Boot Camp" for public officials, including lessons on telling a story with data, data visualisations and data science for policy makers.[109] NYU's GovLab have created "Solving Public Problems with Data", a series of online lectures by leading experts on data science and analytical thinking in the public interest.[110] The Beeck Center for Social Impact and Innovation[111] at Georgetown University, an inter-sectoral broker dedicated to social impact, has launched a Digital Service Collaborative[112] to provide expert support on delivering better results digitally, and bringing together and cataloguing useful resources for upskilling the digital government workforce (e.g. templates for position descriptions and career ladders, and training curricula).[113] OPSI's Toolkit Navigator also includes tools and resources supporting digital transformation, some of which are related to upskilling.[114]

Fostering exchanges of skills and capacities

While capacity strategies, training programmes and multi-disciplinarity approaches to problem-solving go a long way to providing the types of skills public officials need in order to innovate, some of the most useful programmes are those that bring together people from different sectors to exchange knowledge and skills. These efforts can be linked to efforts to bring about a "seamless government" through building out "collaborative infrastructure", as covered in the second 2020 Global Trends report.[115] However, where those projects sought to build conduits for collaboration to achieve common goals, the efforts in this report focus more specifically on allowing the knowledge and skills of groups to influence and diffuse across boundaries in order to create upskilling opportunities and change mindsets and culture.

At the highest level, recent innovative government initiatives in this area have focused on allowing individuals from different sectors, with different perspectives, to introduce new skills into government, while also allowing those individuals to better understand and see how government is working on their behalf. Latvia's "An Official Shadows an Entrepreneur" programme, as discussed in the final case study, is an excellent example of this approach, which is simple yet effective, and could be replicated by almost any government. Other encouraging examples include the following:

105 See https://oecd-opsi.org/toolkits/australias-bizlab-human-centered-design-curriculum.

106 www.bloomberg.org/program/government-innovation/what-works-cities.

107 https://whatworkscities.bloomberg.org/sprints-2.

108 https://whatworkscities.bloomberg.org/certification.

109 https://apolitical.co/five-week-data-bootcamp.

110 http://sppd.thegovlab.org.

111 https://beeckcenter.georgetown.edu.

112 https://beeckcenter.georgetown.edu/project/digital-service-collaborative-building-capacity-for-digital-transformation-in-government.

113 See https://beeckcenter.georgetown.edu/project/upskilling-the-government-tech-workforce.

114 See https://oecd-opsi.org/guide/digital-transformation.

115 See https://trends.oecd-opsi.org for all 2020 trends reports.

» **Start-up in Residence** is a five-month programme with training and hands-on experiences that brings together public officials and employees from start-ups to learn from each other and consider new approaches and solutions to public (often local) challenges. It combines extensive training with a mentorship programme that upskills individuals in both the public and private sector. It has been deployed in cities such as Amsterdam[116] and San Francisco.[117]

» **Government Mentor Programme** (India)[118] is an initiative started by the Government of Telangana, India, for public officials and individuals in private sector start-ups. It is designed to build familiarity and bridge the gap between these groups in order to foster a culture of innovation across the state. Government employees benefit from new skills in engagement, new perspectives from private sector experiences and the identification of new solutions that can be used for the public good, while businesses benefit from a better comprehension of how to understand and navigate governments rules and processes (Figure 10).

» **Lightning Lab GovTech** (New Zealand)[119] is a three-month government accelerator programme that takes govern ment teams through a six-stage innovation process of problem discovery, solution co-design, market validation and technology integration to deliver citizen-centred solutions. Through LLGovTech, government departments can create more innovative, efficient and effective solutions to better serve citizens. Teams consist of three to five full-time staff and represent a mix of government agency staff and people from the private and community sectors. Beyond solutions, a key value of the programme is the upskilling of public officials through a process of immersive "learning by doing" alongside individuals inside and outside government.

» **Learning Together for Better Public Engagement** (Learn4PE) (Canada)[120] is a pilot programme to build public engagement skills and capacity across the Government of Canada. In its first iteration, participants spent five weeks learning together, both online and in person with experts, and collaborating on a variety of topics (e.g. designing public engagement processes, engagement with Indigenous peoples, relationship building). While the objectives are targeted towards public officials, registration is open to all, allowing for the exchange of relevant ideas and resources, which is a constituent element of public engagement.

Figure 10: Government Mentor Programme participants

Source: https://oecd-opsi.org/innovations/government-mentor-program.

116 https://startupinresidence.com.

117 www.innovation.sfgov.org/stir.

118 https://oecd-opsi.org/innovations/government-mentor-program.

119 See https://oecd-opsi.org/innovations/lightning-lab-govtech and http://llgovtech.co.nz.

120 See https://oecd-opsi.org/innovations/learn4pe.

However, not all efforts are intended to promote upskilling across sectoral boundaries. A number of interesting and impactful initiatives focus on the diffusion and enhancement of skills within and across the public sector:

- **Digital Apprenticeships** (London, United Kingdom). The London Office of Technology Innovation (LOTI) has created a Digital Apprenticeship initiative to stimulate digital opportunities and upskilling in local government in London boroughs.[121] It committed to working with boroughs to create at least 100 digital apprenticeships by September 2020, and achieved this goal in August. At the outset, LOTI developed a living playbook on how to design and run a successful digital apprenticeship programme, which could be useful for other governments considering a similar path.[122] It also established a network for managers of digital apprentices, as well as one for apprentices, to allow for the exchange of experiences and learning. LOTI has also partnered with Microsoft to provide virtual learning sessions for apprentices on technical and soft skills.

- **Policy Hub** (Australia).[123] This cross-government collaboration hub is designed to overcome the skills gap in the public sector. The Policy Hub includes a repository of useful tools and resources as well as professional development opportunities (e.g. training). Importantly, it also includes a "Find an Expert" feature that allows users to locate those with relevant skills and expertise (Easton, 2019b).

- **IT Modernisation Apprenticeships** (United States). This initiative helps government to develop a 21st century culture, build user-centred skills and capacities, and innovate from within by providing cross-agency experiences for learning and development through hands-on learning, on-the-job training and networked mentorship (see Figure 11). Through assessment of the programme's initial cohort, the government has surfaced four "impact levers" that can help lower barriers to workforce innovation and culture change: 1) operational innovation, 2) diverse relationships, 3) holistic growth and 4) scalable knowledge.[124]

Figure 11: Apprentice leading a human-centred design workshop

Source: https://digital.gov/2019/11/20/it-modernization-apprenticeship-experience-breaking-down-workforce-innovation-barriers-at-usda.

Such efforts foster a better understanding among all who participate. In addition to introducing public officials to new and enhanced skills, these initiative also foster collaboration across and within government, as well as with the private sector and civil society.[125] The combination of new skills learned from others, and new connections and pathways for collaboration, enables public officials to design and implement innovative policies and services that have greater potential for real impact.

121 See https://loti.london/projects/digital-apprenticeships for details and a programme timeline.

122 See https://loti.london/resources/digital-apprenticeships-playbook.

123 www.policyhub.gov.au.

124 See https://digital.gov/2019/11/20/it-modernization-apprenticeship-experience-breaking-down-workforce-innovation-barriers-at-usda for additional details on each impact lever.

125 https://oe.cd/seamless-gov.

An Official Shadows an Entrepreneur

Latvia

KEY THEME 02: Case Study

“We have to stop dividing people into those who work in business and those who work in public administration. The only ‘medicine’ is co-operation, so this project directly focuses on promoting mutual understanding of what happens every day.”

–Jānis Endziņš, Chairman of the Board of the Latvian Chamber of Commerce and Industry[126]

Design thinking and user-centred approaches have proven to be critical skills for designing and implementing effective government policies and services. However, in order for them to work, governments need to be able see, understand and interact with the individuals and businesses that their work impacts. Realising that this represented a challenge in Latvia, the government created the initiative “An Official Shadows an Entrepreneur”[127] to help public officials step into the shoes of business owners, gain new insights into their operations and experiences, and learn new collaborative and user-centred skills.[128] The initiative is beneficial for both sides. On the business end, entrepreneurs have the opportunity to work beside and receive advice from a government official, as well as obtain feedback on how to solve potential issues or problems. For government, officials have the opportunity to better understand how their work and decisions affect end users, and learn new ways to enhance current policy and conduct future policy design activities on the basis of fresh insights. The first two cohorts comprising officials from 56 government organisations shadowed 75 businesses, and Latvian officials are actively exploring ways to enhance and expand the initiative for 2021.

The problem

The Government of Latvia has recently placed more emphasis on citizen-oriented approaches, for instance, by developing a public sector innovation lab and organising design thinking courses across the public sector. Such actions have been taken to help overcome a longstanding and key stumbling block to government effectiveness and responsiveness – public officials in the government were far removed from the final recipients of their work and often had little understanding of their lived experiences, including how government activities (e.g. regulations, policies and services) impacted them. This made it difficult for government officials to actually apply the design thinking techniques and user-centred approaches they wanted to disseminate. In addition, government officials in Latvia often receive anecdotal information about interpretations of laws and the attitudes of public institutions, but had little direct experience or understanding of how their rules were being interpreted and applied on the ground. On the government’s side, this lack of understanding can provoke issues or problems in the drafting of regulations and policies and the design of services. On the entrepreneur side, it can result in the incorrect application of rules and missed opportunities to participate in programmes. One factor that strongly stimulates economic activity and the competitiveness of Latvian companies is the business environment. While recent measures had resulted in improvement in this area, the government decided to address these obstacles to design thinking in ways that would further enhance conditions for business.

126 www.em.gov.lv/en/news/26962-99-functionaries-take-part-in-the-shadow-day-of-companies.

127 See https://oecd-opsi.org/innovations/official-shadows-entrepreneur and https://ierednieno.org.

128 Unless otherwise indicated, the information for this case study was sourced from an interview and correspondence with Kristaps Soms, Director at the Latvian Ministry of Economics, in October 2020, and from the Latvia Call for Innovations submission at https://oecd-opsi.org/innovations/official-shadows-entrepreneur.

An innovative solution

To eliminate roadblocks to design thinking and user-centred approaches, and help create a more efficient and effective business environment, the State Chancellery's Innovation Lab (formerly #GovLabLatvia) (Box 13) created "An Official Shadows an Entrepreneur". The prototype was the result of co-creation and design thinking approaches, and inspired by the country's Junior Achievement Shadow initiative, where students shadow career professionals to learn about potential options. The new initiative allows public officials to step into the shoes of entrepreneurs in order to gain new insights, experiences and skills. The prototype was piloted by the Ministry of Economics in 2019 and continued into 2020. To ensure that the initiative and its objectives were meaningful, the initiative was developed in co-operation with business organisations such as the Latvian Chamber of Commerce and Industry, the Latvian Employers Confederation, the Business Union of Latvia and Junior Achievement Latvia.

Box 13: The State Chancellery's Innovation Laboratory (#GovLabLatvia)

The State Chancellery's Innovation Laboratory (formerly known as #GovLabLatvia) is an innovation lab and small team within the State Chancellery which leads many cross-government public sector innovation efforts, including helping with specific innovation projects. In addition to the initiative "An Official Shadows and Entrepreneur", its efforts include supporting the development of innovation culture and enhancing innovation across the Latvian public sector. The Lab's specific efforts include providing a forum for co-creation, applying new innovative approaches, holding design thinking workshops and introducing innovation approaches to senior managers.

Source: Country Scan: the Public Sector Innovation System of Latvia (OECD OPSI, forthcoming).

The experience has been positive for both public sector officials and private sector participants. The initiative gave entrepreneurs the opportunity to work beside and receive advice from a government official, as well as receive feedback on how to solve potential issues or problems, such as those related to implementing and complying with government rules and regulations. Entrepreneurs are also able to suggest and encourage improvements to policies, regulations, and other government rules and procedures, thus contributing directly to the drafting and improvement of Latvian laws and even EU legislation.

Government officials, on the other hand, have the opportunity to learn from entrepreneurs. Working directly with end users allows them to better understand the implementation and performance of government-created rules and regulations. The initiative also provides an opportunity to gain new skills and experience, broaden horizons, "step into the shoes of an entrepreneur", and evaluate how government policies and regulations are being applied in practice and whether they might need further development. The initiative also strengthens the application of the "Consult first" principle, introduced in Latvia in 2017, which aims to facilitate dialogue between the national government and the private sector in order to reduce the administrative burden.

For each of the last two years, the government has created an open period where entrepreneurs can apply to participate in the initiative and host a public official, and public officials can apply to participate to shadow them. Entrepreneurs can describe any specific business environment challenges or areas of confusion that they face and specific subject areas they would like to address. They can also indicate specific public authorities or even specific officials that have a direct impact on their work and invite them to their facilities. To help ensure coverage, this year, all government entities were asked to nominate public servants to participate. If the Ministry is unable to find a public sector applicant to match with a private sector applicant, they actively reach out to government organisations to identify a participant for the initiative.

After the application window closes, the Ministry of Economics reviews all allocations and pairs the subject domain and stated needs and challenges of the entrepreneurs with one or more relevant public officials whose role makes for a good match. In his interview with OPSI, Kristaps Soms, Head of the Entrepreneurship Competitiveness Department of the Ministry of Economics of Republic of Latvia, noted that where possible, the government tries to match entrepreneurs with both a senior-level civil servant and a public official on the ground, so that the entrepreneur can gain dual perspectives, and the government can obtain a better sense of its impact at strategic and tactical levels.

Figure 12: The shadowing initiative in action

Source: https://oecd-opsi.org/innovations/official-shadows-entrepreneur.

The actual shadowing experience is unique in each case, and is largely shaped by the participating private sector company. A wide range of businesses participate, ranging from fisheries to automotive technology companies. Some shadow experiences may involve board meetings, while others may necessitate overseeing production lines. Mr Soms told OPSI that valuable insights are gained on both sides, and that, in most cases, the public official is able to help the entrepreneur address any specific challenges and issues on site. If this is not possible, the official works to further understand and research issues and provides feedback to the company shortly thereafter. To support positive outcomes, the government collects follow-up forms from the companies to make certain that their questions and challenges have been addressed, and to ensure that are satisfied with the initiative.

The initiative allows government officials to look beyond their own experiences and day-to-day work, and gain an outside perspective on how their works affects end users – including potential challenges and unintended consequences. Such insights cannot be learned from a training course or webinar, and can result in meaningful change to working approaches, as they account for factors never previously considered. Likewise, the initiative provides entrepreneurs with a human face for government and helps them to understand the perspective of officials. This approach helps to promote exchange of experiences and perspectives, and bring about new skills of collaboration and dialogue on both sides. In many cases, it also provides entrepreneurs with immediate solutions to specific and often long-standing problems. For instance, an entrepreneur who participated in the 2019 programme wanted to expand their business but had been unable to source financing for months. During the shadow experience, a government official who was an expert in financial support programmes was able to walk the entrepreneur through alternative funding models and also introduce them to best practices for enhancing their production line. This solution that was identified proved successful, and the business has since expanded. On both sides, the initiative has helped to build trust across sectoral boundaries.

The initiative also helps to improve government by allowing the public sector to reflect on what it has done right: what works, helps and is useful to the entrepreneur on a daily basis. It also highlights where the public sector is not as effective, or what could be done better. An open dialogue between the public administration and entrepreneurs is key to a more successful business environment.

The government designed the initiative to work in a transparent manner, with a public-facing dissemination and communication website set up to cover all details of the initiative, including the application process for private sector companies.[129] The government is also developing a public repository of the challenges and proposals submitted by business operators, to enable national authorities to track and resolve entrepreneurial issues, and share and learn best practices in a more systemic manner.

129 https://ierednieno.org.

The initial pilot kicked off in September 2019 with a cohort of 35 entrepreneurs and 99 officials from 30 public institutions. The second cohort was launched in September 2020, and brought together 40 companies and 26 government institutions. Over 200 civil servants have applied to participate over the two years, indicating a strong level of interest among government officials to work more closely with and better understand the entrepreneurs that their work impacts. This initiative will be implemented in 2021, and possibly expanded in the future, in order to further enhance the business environment and serve as a good example of co-operation between public administration and entrepreneurs, including from outside Latvia. Before the launch of the 2021 edition of the programme, the government is evaluating all feedback received and working with employers' associations to determine how to adjust and improve the programme over time, such as by increasing participation and targeting specific goals.

Figure 13: Minister of Economics Jānis Vitenbergs shadowing an entrepreneur

Source: https://oecd-opsi.org/innovations/official-shadows-entrepreneur.

Novelty

Government officials have long exchanged experiences, ideas and skills among each other and with entrepreneurs in through workshops, conferences and other major events. This initiative explores a new type of interaction not previously applied in Latvia or most other countries, which allows public officials to step into the shoes of the individuals their work directly impacts, in order to gain a better understanding and a different set of skills to do their job. The project ensures that a key element of design thinking and co-creation approaches – direct involvement of the client – is implemented in practice by public administration when developing regulations.

Results and impact

The "An Official Shadows an Entrepreneur" initiative has opened the door to a wider range of contacts and feedback from entrepreneurs on various public administration decisions and day-to-day activities. Questionnaire responses from initiative participants, both on the side of government and business, demonstrate strong satisfaction with the programme, and prove that the initiative can bring the public administration closer to business, promote mutual understanding and co-operation, and provide an outlet for collaboration to reduce the administrative burden and enhance problem-solving and collaboration skills. Entrepreneurs who participated in the initiative reported that the approach has helped them resolve issues much faster than through traditional means to interacting with government. The government is currently sending out new questionnaires for the 2020 cohort.

Government of Latvia officials also believe that the initiative constitutes an excellent basis for improving the entrepreneurship environment in Latvia. Over time, they would like to assess the initiative's impact in terms of changing mindsets and enhancing trust in government, as low levels of trust in government is a major issue for Latvian society. Measuring this impact may be difficult, however.

The Ministry of Economics is also exploring how to better evaluate the impact of the shadow programme in terms of changes at the government end (e.g. improved rules and regulations). These potential impacts are not yet known.

Challenges and lessons learned

Entrepreneurs are often reluctant to engage with public administrations, so initially there was a concern that few entrepreneurs would apply. However, the government approached this issue by maintaining open channels of communication and addressing concerns through marketing and communications campaigns. Government officials believe more can be done, however. For instance, only about 50% of the public servants who applied for the 2020 programme were matched with an entrepreneur to shadow. The government is also continuing to explore ways to address challenges and eliminate barriers to entrepreneur participation in the initiative, and aims to increase participation rates on both sides for 2021.

A key lesson learned through the initiative was the need for a dedicated, accountable authority responsible for the programme's success (as opposed to a distributed model, for instance). Without a single project owner to push the initiative forward, and ensure that good matches are made and shadowing meetings take place, the programme will not gain momentum.

In terms of success factors, the support of the Minister and senior management of the Ministry of Economics was critical to ensuring the successful implementation of the pilot project. The senior management addressed other public institutions, presented the concept of the initiative and, thus, motivated public officials to become more open and collaborative. The initiative's collaborators and partners were also actively involved in developing the website, application form, matching process and communications strategy.

Replicability

The concept behind the initiative is highly replicable. A similar programme could work well in nearly any national government, as well as at the local level with local government employees shadowing local businesses.

Latvian officials believe that the concept could also be flipped, with entrepreneurs shadowing public officials.

Recommendations

The skills and capacities of both the public and public officials is a foundational and cross-cutting issue – one that is critical to securing the competitiveness of citizens and residents in a rapidly changing economy and society, and to ensuring that those working in government are equipped with the capabilities necessary to design and implement innovative policies and services for a 21st century world. As can be seen throughout this report, governments at all levels are taking great strides to ensure their people are not left behind and that their workforce is ready to tackle increasingly complex and uncertain challenges. OPSI and the MBRCGI have identified several recommendations that can help innovative countries take their upskilling efforts to new levels and also assist others in catching up:

1. **Make upskilling a priority mission.** The efforts discussed in this report are highly encouraging and demonstrate significant awareness among governments of the importance of making 21st century skills available to *everyone*. However, many of these efforts are lacking in bold and sustained strategic direction with ambitious, clear and con crete objectives set by the most senior levels of government. In other words, they are not missions. Reframing and bundling upskilling efforts under a unified mission allows governments to reorient various activities and actors towards a common overarching goal. This increases the potential for impact beyond what such efforts could achieve on their own. OPSI's work on mission-oriented innovation[130] can help users understand the concepts behind this form of orientation. Other resources include the European Commission's work on mission-oriented innovation,[131] the outputs of the Mission-Oriented Innovation Network (MOIN)[132] (e.g. the Routes, Organisations, Assessed, Rewards – ROAR – Framework),[133] and publications from the UCL Institute for Innovation and Public Purpose (IIPP).[134]

130 See www.oecd-opsi.org/innovation-facets-part-4-mission-oriented-innovation.

131 https://ec.europa.eu/info/horizon-europe/missions-horizon-europe/mission-oriented-policy-studies-and-reports_en.

132 www.ucl.ac.uk/bartlett/public-purpose/partnerships/mission-oriented-innovation-network-moin.

133 https://link.springer.com/article/10.1007/s10842-019-00329-w.

134 www.ucl.ac.uk/bartlett/public-purpose/publications. *The Missions: A beginner's guide* would be a good publication to start with (www.ucl.ac.uk/bartlett/public-purpose/publications/2019/dec/missions-beginners-guide).

2. **Ensure an equal focus on environment and structures.** Even in cases where government has made upskilling a dedicated mission, people with vital skills will still face significant barriers unless additional action is taken to put them to use. Governments must ensure that the environment and structures within government (leadership attitude and involvement, organisational structures, job families, career paths, evaluation systems, etc.) are conducive to making the most of these skills and creating an atmosphere where upskilling, over time, can engender a broad cultural shift that supports innovation across the public service. OPSI's work on Systems Approaches[135] and PEM's efforts to support governments in implementing the OECD Recommendation on Public Service Leadership and Capacity[136] can help in this regard.

3. **Take extra measures to ensure that all parts of society have equitable access to opportunities.** A number of segments of society are underrepresented when it comes to participation in 21st century educational and career paths (e.g. lower rates of women and ethnic minorities in STEM fields). As emphasized by the examples and case studies in this report, governments must take additional measures to ensure that these fields and skills are attractive and welcoming to underrepresented groups, and that these groups have the opportunity to join in, learn and participate.[137]

135 https://oecd-opsi.org/projects/system-approaches.

136 www.oecd.org/employment/pem.

137 See www.oecd-opsi.org/diversity-in-innovation-towards-inclusive-innovation for OPSI's thinking on diversity in innovation.

Conclusion

The individuals that comprise society represent a valuable natural resource that is critical to ensuring countries can remain competitive in the modern economy, keep up with rapid technological shifts and growing complexity, and meet changing and growing demands. As with any natural resource, action and investments are vital to capitalise on this potential. Accordingly, governments are developing innovative upskilling programmes – investing in the innovative, digital, cognitive and socio-emotional skills of their people as well as the public officials who work in their interest. Governments are also retooling structures to support these skills, and in so doing are providing new pathways and opportunities for success.

While major efforts are underway worldwide, opportunities exist to take these initiatives further. As well as addressing gaps in skillsets, governments must pay more attention to gaps in structure (e.g. linkages within and across government to promote skills diffusion and culture change), geography (e.g. the global south), underrepresented groups (girls and women in STEM fields, ethnic minorities), and those at risk of falling through the cracks (e.g. older workers whose jobs are at risk of automation). Enhanced action by government is essential to bring about a culture of lifelong learning and growth, to unite and create synergies among efforts that would otherwise be fragmented, and to ensure equitable access to 21st century skills and capacities for all. Such efforts must also be innovative, as traditional approaches are no longer sufficient to cope with the transformative and disruptive potential of Artificial Intelligence, the spread of disinformation through social networks, and the need for new ethical concepts and frameworks for the digital age. Such upskilling is vital not only for broader society, but also for public officials, who need a good working knowledge of these new approaches and how best to leverage them to improve the public sector.

This report is the fifth and final in a series on global innovation trends in 2020 – a year in which the world has changed drastically, as highlighted in the launch event for this report, *Government After Shock*.[138] The COVID-19 pandemic has shaken our understanding of how the world, societies, work and government should function. Despite the past and ongoing upheaval and the present uncertainty regarding the future, the events of this year have made one thing clear: the people that constitute our societies, communities and workplaces are what matters most. As this report and the four preceding reports in the 2020 *Global Trends* series have shown, governments are taking innovative action to support their populations, to equip them with the skills and abilities necessary to succeed in the 21st century, and to work with them to create a foundation for a prosperous future. Although the current circumstances are characterised by a lack of certainty, OPSI and the MBRCGI are confident that through innovation and creativity, governments and their partners will succeed in leading their people through turbulent and difficult times while making strategic investments in their future.

138 https://gov-after-shock.oecd-opsi.org.

References

ANZSOG (2019), *Today's Problems, Yesterday's Toolkit*, Australia and New Zealand School of Government, Carlton, Australia, www.thegovlab.org/static/files/publications/ANZSOG-report.pdf.

Basu, M. (2020, 31 January), "Three ways countries are using AI and data to track employment", *GovInsider*, https://govinsider.asia/innovation/estonia-singapore-thailand-united-nations-three-ways-countries-are-using-ai-and-data-to-track-employment.

Charlton, E. (2019, 21 May), "How Finland is fighting fake news – in the classroom", *World Economic Forum*, www.weforum.org/agenda/2019/05/how-finland-is-fighting-fake-news-in-the-classroom.

Cusack, E. and K. Zheltoukhova (2020, 10 February), "Shifting workers at risk from precarious to prepared", *Nesta*, www.nesta.org.uk/blog/shifting-workers-risk-precarious-prepared.

Delcker, J. (2019, 2 January), "Finland's grand AI experiment", *Politico*, politico.eu/article/finland-one-percent-ai-artificial-intelligence-courses-learning-training.

Dickinson, H. et al. (2019), *Reimagining the Future Public Workforce*, Springer, Singapore, DOI10.1007/978-981-13-1480-3.

Dondi, M. et al. (2020, 7 February), "A government blueprint to adapt the ecosystem to the future of work", *McKinsey & Company*, www.mckinsey.com/industries/public-and-social-sector/our-insights/a-government-blueprint-to-adapt-the-ecosystem-to-the-future-of-work.

Easton, S. (2019a, 14 August), "APS Commission wants to develop 'digital career pathways' but first has to define digital careers", *The Mandarin*, www.themandarin.com.au/113876-aps-commission-wants-to-develop-digital-career-pathways-but-first-has-to-define-digital-careers.

Easton, S. (2019b, 21 June), APS secretaries unveil online collaboration hub in push to improve policy skills", *The Mandarin*, www.themandarin.com.au/110225-aps-secretaries-unveil-new-online-collaboration-hub-in-push-to-improve-policy-skills.

European Commission (2019), *Digital Government Factsheet 2019: Italy*, Brussels, https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital_Government_Factsheets_Italy_2019_0.pdf.

European Commission (2018), *A multi-dimensional Approach to Disinformation: Report of the High level Group on fake news and online disinformation*, Directorate-General for Communication Networks, Content and Technology, Brussels, https://op.europa.eu/en/publication-detail/-/publication/6ef4df8b-4cea-11e8-be1d-01aa75ed71a1.

Gerson, D. (2020), "Leadership for a high performing civil service: Towards senior civil service systems in OECD countries", *OECD Working Papers on Public Governance*, No. 40, OECD Publishing, Paris, https://doi.org/10.1787/ed8235c8-en.

Gustafsson, M. (2020, 19 May), "Young workers in the coronavirus crisis Findings from the Resolution Foundation's coronavirus survey", *Resolution Foundation*, www.resolutionfoundation.org/app/uploads/2020/05/Young-workers-in-the-coronavirus-crisis.pdf.

Holland, M. (2020, 22 April), "Starting with skills: Data-driven, networked approaches to workforce development in the Covid era", *Data-Smart City Solutions*, https://datasmart.ash.harvard.edu/news/article/starting-skills-data-driven-networked-approaches-workforce-development-covid-era.

Huawei (2018, 29 August), "Malaysia vs Singapore: two different approaches to the digital revolution", *GovInsider*, https://govinsider.asia/security/malaysia-vs-singapore-two-different-approaches-to-the-digital-revolution.

Kovács-Ondrejkovic et al. (2019, 5 November), *Decoding Global Trends in Upskilling and Reskilling*, BCG Henderson Institute, Boston, MA, www.bcg.com/publications/2019/decoding-global-trends-upskilling-reskilling.

Matasick, C., C. Alfonsi and A. Bellantoni (2020), "Governance responses to disinformation: How open government principles can inform policy options", *OECD Working Papers on Public Governance*, No. 39, OECD Publishing, Paris, https://doi.org/10.1787/d6237c85-en.

McIvor, C. (2020, 22 July), "A mission-oriented approach to the UK skills system", *Nesta*, www.nesta.org.uk/project-updates/mission-oriented-approach-uk-skills-system.

McKinsey & Company (2017), *Digitally-enabled Automation and Artificial Intelligence: Shaping the Future of Work in Europe's Digital Front-Runners*, McKinsey & Company, New York, www.mckinsey.com/featured-insights/europe/shaping-the-future-of-work-in-europes-nine-digital-front-runner-countries.

OECD (forthcoming), Digital Economy Outlook 2020.

OECD (forthcoming), OECD Framework for Digital Government Skills and Talent.

OECD (2020, forthcoming), OPSI Survey on Public Service Skills Needs, https://oe.cd/ncps.

OECD (2020), *The OECD Digital Government Policy Framework Six dimensions of a Digital Government*, OECD Public Governance Policy Papers No. 02, https://doi.org/10.1787/f64fed2a-en.

OECD (2019a), *OECD Skills Outlook 2019: Thriving in a digital world*, OECD Publishing, Paris, https://doi.org/10.1787/df80bc12-en.

OECD (2019b), *OECD Employment Outlook 2019: The Future of Work*, OECD Publishing, Paris, https://doi.org/10.1787/9ee00155-en.

OECD (2019c), *Hello, World: Artificial Intelligence and its Use in the Public Sector*, OECD Publishing, Paris, https://oecd-opsi.org/wp-content/uploads/2019/11/AI-Report-Online.pdf.

OECD (2019d), *Government at a Glance 2019*, OECD Publishing, Paris, https://doi.org/10.1787/8ccf5c38-en.

OECD (2019e), *Innovation Skills and Leadership in Brazil's Public Sector: Towards a Senior Civil Service System*, OECD Public Governance Reviews, OECD Publishing, Paris, https://doi.org/10.1787/ef660e75-en.

OECD (2019f), "Why everyone in Finland's teaching themselves AI. Teemu Roos, U of Helsinki, tells us" (podcast), *SoundCloud*, https://soundcloud.com/oecd/finlandartificalintelligence.

OECD (2018), *Bridging the Digital Gender Divide: Include, Upskill, Innovate*, OECD Publishing, Paris, www.oecd.org/going-digital/bridging-the-digital-gender-divide.pdf.

OECD (2017a), *OECD Digital Economy Outlook 2017*, OECD Publishing, Paris, https://doi.org/10.1787/9789264276284-en.

OECD (2017b), *Innovation Skills in the Public Sector: Building Capabilities in Chile*, OECD Public Governance Reviews, OECD Publishing, Paris, https://doi.org/10.1787/9789264273283-en.

Pekkarinen, A. (2019, 10 December), "Elements of AI online course to expand throughout the European Union", *University of Helsinki* (website), www.helsinki.fi/en/news/data-science-news/elements-of-ai-online-course-to-expand-throughout-the-european-union.

PwC (2020), *Digital Ethics: Orientation, Values and Attitudes for a Digital World*, PricewaterhouseCoopers, London, www.pwc.de/de/managementberatung/pwc-digitale-ethik-white-paper-en.pdf.

Reaktor (2019, 4 April), "Elements of AI – a free online course on the basics of AI" (video), *YouTube*, www.youtube.com/watch?v=1n4XtfzHuo8.

Rohaidi, N. (2019, 5 July), "Exclusive: How Estonia is training young people to spot fake news", *GovInsider*, https://govinsider.asia/connected-gov/mart-laidmets-kristel-rillo-estonian-ministry-of-education-and-research-fake-news-digital-competence.

Torfing, J. (2019), "Collaborative innovation in the public sector: The argument", *Public Management Review*, Vol. 21/1, pp. 1-11, https://doi.org/10.1080/14719037.2018.1430248.

Vanderkelen, M. (2020, 15 September), "Elements of AI disponible en Belgique" [Elements of AI available in Belgium], www.digitalwallonia.be/fr/publications/elements-of-ai.

van der Vlies, R. (2020), "Digital strategies in education across OECD countries: Exploring education policies on digital technologies", *OECD Education Working Papers*, No. 226, OECD Publishing, Paris, https://doi.org/10.1787/33dd4c26-en.

van Meerkerk, I. and J. Edelenbos (2018), *Boundary Spanners in Public Management and Governance*, Edward Elgar, Cheltenham, UK, https://doi.org/10.4337/9781786434173.

Welby, B. (2019), "The impact of digital government on citizen well-being", *OECD Working Papers on Public Governance*, No. 32, OECD Publishing, Paris, https://doi.org/10.1787/24bac82f-en.

Welsh Government (2019), *Draft Statutory Guidance: A Guide to Curriculum for Wales 2022*, Cardiff, https://s3-eu-west-1.amazonaws.com/hwb-live-storage/cd/b4/f8/7c/b7d34ffb968d9a09de4d460c/a-guide-to-curriclum-for-wales-2022.pdf.

Williams, P. (2012), *Collaboration in Policy and Practice: Perspectives on Boundary Spanners*, Policy Press, Bristol.

World Bank (2019), *World Development Report 2019: The Changing Nature of Work*, World Bank Group, Washington, DC, http://documents1.worldbank.org/curated/en/816281518818814423/pdf/2019-WDR-Report.pdf.

OECD
BETTER POLICIES FOR BETTER LIVES

OPSI Observatory of Public Sector Innovation

مركز محمد بن راشد للابتكار الحكومي
MOHAMMED BIN RASHID CENTRE FOR GOVERNMENT INNOVATION

WORLD GOVERNMENT SUMMIT

trends.oecd-opsi.org