Second International Conference on AI in Work, Innovation, Productivity and Skills (AI-WIPS)

2022 Conference Highlights

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The Second International Conference on AI in Work, Innovation, Productivity and Skills was held on 21-25 February 2022 by the OECD Directorates for Science, Technology and Innovation (STI), Employment, Labour, and Social Affairs (ELS), and Education and Skills (EDU). It was supported by the German Federal Ministry of Labour and Social Affairs.

As part of the OECD Programme on AI in Work, Innovation, Productivity and Skills (AI-WIPS), the conference aimed at advancing a multi-disciplinary and evidence-based policy debates to drive adoption of AI in the world of work that is trustworthy, responsible, effective, beneficial, and human-centred.

> **"Progress needs trust, and trust needs knowledge."**
>
> – German Federal Minister of Labour and Social Affairs

Speakers in the High-Level Ministerial session on "Shaping coherent policies for AI" agreed that in order to build trustworthy, human-centric AI systems, we need to regularly update our understanding of advances in AI capabilities and support the development, diffusion, and use of AI across economies, including small and medium-sized enterprises.

The OECD's Secretary-General, Mathias Cormann, highlighted that rather than displacing high-skilled workers, AI can be used to complement their skills and enablehigher productivity and wages.

The German Minister of Employment and Social Affairs H.E. Hubertus Heil stressed that we need to build trust in AI service delivery and avoid the exploitation of the workforce.

Former President of Estonia Kersti Kaljulaid presented lessons learned from the advances in digitalisation that the Estonian healthcare, taxation, education, and public sectors have made over the years, including taking public service delivery online.

> **"Technology should meet education and available skills half way, not only the other way around."**
>
> – Daron Acemoglu, Professor, Massachusetts Institute of Technology (MIT)

Speakers coalesced on the need to govern the "autobahn (highway) of data exchange" powering AI technologies with "comprehensive, targeted rules" to guide responsible innovation, and the need for dialogue on the mechanisms to put them into practice.

The rest the conference highlighted a number of obstacles and policy actions needed to more fully realising the benefits of AI. While recent predictions of dramatic labour replacement have been far off the mark, efforts are needed to target the transparent and inclusive application of AI. AI can enhance the efficiency and quality of matching workers to jobs. Investing in a diversity of AI-related skills is essential – ranging from programming and technical skills to soft and problem solving skills for managers. A nuanced approach to training is required, with efforts to increase the diversity of AI developers and mainstream AI across public and private functions across organisations. At the same time, we need to remain realistic about what education can do.

Promoting access and adoption among small and medium enterprises remains a challenge. Smaller firms struggle to keep up with different approaches to AI regulation. Action is needed to streamline the application of AI to support more equitable uptake, promote competition and consumer protection and boost R&D and access to complementary assets. The availability of robust and representative data can further mediate where the development of AI technologies takes place, with access to AI technologies remaining concentrated among larger firms.

While AI could help usher in a new era of scientific discovery, it still has its limits. Advances in reasoning are essential for AI capabilities to become more generalisable across more varied situations. Evaluations of AI capabilities should also be linked to human skills. Involving non-AI experts can support a broader understanding of problem requirements.

Existing anti-discrimination law and tools such as algorithmic auditing can be used to protect employees in a workplace transformed by AI. Social partners across OECD countries have already started informing workers and employers on the benefits and risks of AI, and some have started calling for the introduction of new rights.

The development and regulation of AI needs to be enforceable, inclusive, and adaptive. Targeted, evidence-based, and people-centered policy-actions

working in tandem can help us build and implement trustworthy and resilient AI systems fit for a rapidly changing world of work. The OECD Framework for Classifying AI Systems is a tool for policymakers, regulators, legislators and others to assess the opportunities that different types of AI systems present and inform national strategies.

AI and machine learning techniques have been around since the 1950s. In the 1980s, machine intelligence was envisioned to complement and help humans. For many, this hope has since transformed into fear, with AI now often viewed as a black box applied to replicate human tasks – most often by big companies. Daron Acemoglu stressed that this type of application of AI may bring only modest productivity gains and not counter its negative impacts – notably in terms of worker displacement and the shift of power from individuals to companies. Failing to apply AI in transparent and inclusive ways, and not translating high-level AI principles to clear, actionable standards and practices may undermine our efforts to leverage the benefits of AI to support humans in the future of work.

While investing in education is essential, it is important to remain realistic about what education can do. First, not all individuals can be equipped with the right skills to thrive in an environment transformed by AI. Second, designing effective retraining programs is not always straightforward. Technology creation and adoption is endogenous; the direction of technological developments is not inevitable and can be changed.

> **"Here's the key conceptual mistake: just because a technology can take over a task that humans do doesn't mean there's less work for humans to do. In fact what happens is what we call the remainder effect: when one task is automated, the value of human skills on the remaining becomes even more important."**
>
> – James Bessen, Professor, Boston University

Concerns that AI may result in dramatically replacing workers have not yet materialised.

Predictions of AI replacing workers en masse obscure the real impact of AI. Evidence to date shows that AI is not about machines replacing humans, but about complementing humans and helping them innovate.

AI use tends to lead to increased employment in occupations where computer use is high. Firms using AI see their average wages increase because they demand greater skills. In all these areas, AI is in many ways not a sharp break from prior phases of digitalisation, but rather an acceleration.

AI can enhance the efficiency and quality of matching workers to jobs.

AI is being used to match workers to job vacancies by human resource managers, public and private employment services, and in the platform economy. AI can help enhance the efficiency and quality of labour matching, thus reducing unemployment and reducing skills mismatch. However, risks remain – for example in terms of discrimination, privacy, and transparency. Organisations are taking steps to address these risks. The Flemish public employment service, for example, has introduced ethical principles for the use of AI and will set up an ethical advisory board. Through the GDPR, the EU AI Act and, most recently, the proposed Directive on Platform Work, the EU is advancing regulation on transparency, privacy, and the need for human monitoring. Regulatory actions need, however, to be balanced against placing disproportionate burdens on low-risk applications.

Up-skilling and reskilling are integral for an equitable application of AI.

Helping workers acquire new skills, and develop both technical and management capacities suited to the workplace of the future, is essential to support efforts at the firm and worker levels that risk losing out from the increased use of AI in the workplace.

> **"We see that demand for AI skills has grown over the last three years. In this period, the percentage of online job postings requiring machine learning skills has doubled in countries like Germany, Canada and the United Kingdom and tripled in countries like the United States and South Africa."**
>
> – Dunja Mladeni, Senior Researcher and Project Leader, Jožef Stefan Institute

Skills needs are changing, with a growing demand for digital skills. Different types of digital skills are needed, for example for engineers who develop new tools, professionals with limited technical background who use existing tools, and managers with strategic knowledge of these technologies to make investment decisions. In other words, AI diffusion hinges on the development not only of programming-specific and technical skills, but also of soft, problem-solving, and managerial skills.

A nuanced approach to training is needed.

Successfully developing the skills needed for the adoption of AI requires a comprehensive training and skilling strategy, ranging from technical skills

programmes, such as PhD-level study focused on the development of new AI methods, to more practice-oriented training required by practitioners in enterprises. Supporting the adoption of AI also calls for training in transversal skills, such as contextual understanding, business acumen, communication skills, and ethics.

New approaches and institutions are needed. Training opportunities need to be co-designed by providers and users, break-down confidence barriers, and be practical, short and accessible – for example in the form of short courses that lead to micro-credentials.

Challenges still remain as reskilling and upskilling may not be possible for everyone. Older workers in particular may be at risk of facing these challenges.

The application of AI should be mainstreamed across public and private organisations.

Instead of operating in siloes, efforts should be made to weave AI officers across the ecosystem of data protection authorities, national statistical organisations and other public offices and private firms to analyse barriers to, and propose targeted solutions for, the uptake of AI.

The diversity of AI designers needs to be increased.

Women remain under-represented in technical fields. There is a need to increase the diversity of AI developers. This includes women, a broader range of nationalities and people of different ethnic backgrounds. Increased diversity is required to ask the questions needed to develop trustworthy, inclusive, and innovative products. Complementary and targeted policy interventions are needed to incentivise technical and digital education among women, young people, and those transitioning between roles in the labour force, tailoring programmes to each population.

Speakers noted that university scholarships, internships, targeted training programmes, and building AI education into high-school curriculums and programmes are particularly helpful in increasing the diversity of the talent pool.

A risk-based approach to AI can help businesses develop more human-centric AI.

The OECD Recommendation on Artificial Intelligence (AI) provides the first intergovernmental standard for AI policies and a foundation on which to foster innovation and trust in AI while ensuring respect for human rights and democratic values. The Principles were developed in view of being implementable and sufficiently flexible to stand the test of time in a rapidly evolving field. Work now remains to translate these high-level Principles into practice. Regulators can take a risk-based approach to assess AI applications and define compliance requirements and guidelines. The OECD Framework for Classifying AI Systems, launched at the Second International Conference for AI in Work, Innovation, Productivity and Skills, is a tool for policymakers, regulators, legislators and others to assess the opportunities that different types of AI systems present and to inform national strategies.

Access to AI technologies is concentrated.

Many digital industries are complex systems, making them difficult to imitate. In addition to challenges in obtaining access to data, smaller firms often find it difficult to compete with larger firms to keep up with resources dedicated to researching, developing, and protecting the rights to these complex systems. This becomes particularly difficult when larger firms use software patents and technology itself to protect their knowledge and differentiate themselves in the market. The concentration of these intellectual property assets can hurt competition, innovation and productivity.

> "What I tell my students is, "Make sure that you are curious about the problem that you are solving, because AI, machine learning, big data – these are all fancy terms [but] in the end it's about a story – it's about getting the data to answer a problem."
>
> – Francesca Lazzeri, Principal Data and Machine Learning Scientist Manager, Microsoft

Governments can address these challenges through more active competition policy, reforms in IPR policies to encourage more diffusion, and greater attention to technology diffusion policies.

Data acts, hardware developments, and evolution in the technology itself offer hope for change. To reduce barriers to adoption, governments can also boost complementary assets, support research and development (R&D) and university-industry knowledge transfer, and incentivise targeted technical and digital education.

Promoting competition calls for measures that go beyond antitrust and regulation, and go hand in hand with innovation, consumer protection policy, and investment in complementary assets.

Competition concerns arising from the adoption of AI need to go beyond antitrust and regulation, looking at broader innovation and consumer protection policies.

There is the need for antitrust enforcers to investigate the use of AI for excessive data collection.that is then exploited to target, discriminate, and extract rent. While it may be premature to act now, transparency on the objective of an algorithm, and help to better understand what the algorithm does, are needed. Measures used to train a model or evaluate its performance should be part of assessing whether the algorithmic conduct is anti-competitive or not.

AI technologies need to be accessible to all organisations.

Small and medium enterprises show slower progress in the uptake of AI. These firms need support to understand which AI tools would be most useful to enhance their service delivery in cost-effective ways. They often do not have the necessary skills in-house, and have difficulties in recruiting staff to support the diffusion and use of AI in the workplace, often due fierce competition for highly skilled AI specialists. Many also lack the necessary digital infrastructure, processes, and management.AI practices to gather and process the data that AI systems require. Obstacles can also include uncertainties around expected returns on investment and a general lack of understanding of AI and its business use cases.

"Simply having more data isn't always the answer. We need truly representative data."

– Vilas Dhar, President and Trustee, Patrick J. McGovern Foundation

The availability of robust and representative data can mediate where the development of AI technologies takes place.

Live data indicators and interactive visualisations show that AI software development (+900%) and demand for AI skills (+150%) have exploded over the past three years. Data on the supply of AI education, jobs, skills, and software development across countries can help policy makers identify gaps and potential challenges and allow them to address these issues with targeted policies.

Governmental, non-profit, and private sector organisations have key roles to play in collecting and sharing data. While advances in the collection and analysis of data have gained momentum, gaps remain. Case studies on the responsible design and use of AI, and timely and representative datasets interlinked with each other to provide a more comprehensive view of the context, are vital to build a more trustworthy, innovative, and inclusive AI ecosystem. The OECD.AI Policy Observatory is a centre for live and timely data on AI education, jobs, skills, and research to inform policymakers and map the diffusion of AI.

The development and regulation of AI needs to be inclusive and adaptive.

Civil society, technical, and trade representatives stressed the importance of taking an adaptive and risk-based approach to AI regulation, flagging the application of AI to erode democratic processes and cross-border implications on geopolitical events.

Of the 2.9 billion people who are still offline, most live in developing countries. Stakeholders noted that steps should be taken to ensure that no one is left behind to support a just digital transition. Ensuring diverse stakeholders and measuring policy actions as they are taken would support an evidence-based approach to AI uptake across stakeholders.

Existing anti-discrimination legislation provides a strong starting point to prevent AI-related bias in the workplace.

The use of AI systems in the workplace has the potential to help reduce discrimination at work, for example by formalising rules in management processes.

Yet AI systems often struggle with bias and risk replicating biases at scale. Existing anti-discrimination laws provide a strong starting point to promote fairness in AI-based workplace decisions. However, bodies tasked with safeguarding equal opportunities in the workplace can do more to provide guidance to stakeholders, and notably employers, about how to abide by legal standards. This needs adequate financial and human resources. Ensuring that applicants and workers are aware that AI is being used will also be important to tackling AI-related workplace bias.

Algorithmic auditing is an important facet of the strategy to ensuring that AI systems are fair.

Algorithmic audits provide a third-party check that best practices are being followed by algorithmic systems – helping ensure that values are upheld and that the algorithm behave as expected once they are used in the real world. Professor Christo Wilson made the case that AI systems that determine opportunities – such as algorithms for workplace management – should be audited. Going forward, it will be important to determine auditing standards, looking at aspects such as 1) whether the auditing should be done against a well-defined and regulated baseline or whether the baseline can be chosen by stakeholder 2) who should conduct the audit and 3) what information has to be disclosed to the auditor and/or to the public.

While algorithmic auditing has been often used to assess fairness, it can be also be used to ascertain privacy. There is however a tension between promoting fairness and privacy in algorithmic systems: the data needed to assess bias against certain groups would require collecting sensitive private data.

"We are starting to be able to answer one question that is being asked again and again, when AI is being used, or the use of AI is being considered, and that is 'what is the risk of using AI?'"

– Sebastian Hallensleben, Head of Digitalisation and AI, VDE Association for Electrical, Electronic & Information Technologies

Tools and instruments for AI governance should be pragmatically enforceable.

Third party assessments, audits, accreditation, certifications, and other conformity assessment schemes should have common standards and be pragmatically enforceable across departments and countries, regardless of whether an omnibus or sectoral approach to AI regulation is adopted.

Different approaches to AI regulation undermine application by employers.

Challenges remain in the translation of high-level AI principles and regulation into practice across and within industries. Companies that develop their own in-house AI tools to meet their own ethical codes need standardised certification systems to reconcile these codes with AI systems developed externally.

There is a need for coherence across different regulatory regimes e.g. in the EU particularly between GDPR and discrimination law and in the US where subnational legislation could lead to too many different requirements for employers. Further, while omnibus (overarching law that regulates across industries, prevalent in the EU) versus sectoral (laws directed towards specific industries, prevalent in the US) regulation have varied benefits and drawbacks, sectoral regulation may be useful in contexts of sectoral collective bargaining, where workers/unions could negotiate outcomes with employers and have a say in the application and impact of AI in the workplace.

Panellists also noted the importance of ensuring that regulation not solely focus on AI, but on all automation, which can be just as ethically problematic. Crucially, governance to build the trustworthy and ethical application of AI needs to be balanced between "guard-railing ethics" and promoting innovation.

Engagement with social partners is key when using AI in the workplace.

Social dialogue has a fundamental role to play in easing transitions and spreading good practices regarding AI adoption in the labour market. Collective agreements can support workers and businesses in the AI transition alongside regulations, as flexible and pragmatic tools that can be tailored to specific sectoral needs.

Social partners across OECD countries have already started informing workers and employers on the benefits and risks of AI, and some have started calling for the introduction of new rights.

At the same time, many social partners find themselves at the nascent stages of of responding to the AI transition, particularly when it comes to signing AI-related agreements and using innovative tools to tackle AI issues. This includes for example, chatbots to inform and organise union members and a self-tracking app for workers to gather key data that could ultimately help unions in bargaining processes.

While there is a growing momentum on AI at the European level that has proved beneficial in negotiations, there are difficulties in bridging different views in tripartite settings and overcoming the politically sensitivities around AI-related issues.

"Supply and demand for AI education have exploded in the past couple of years. Supply [of AI education] has actually gone up 125% on average with 285% growth in Asia and 148% in Europe."

– Thijs van Vugt, Director Analytics and Consulting Team, StudyPortals

AI could help usher in a new era of scientific discovery.

AI has accelerated research on solutions to global challenges, from climate change to disease threats to food insecurity. Combined with robotics, AI helps sift phenomena of interest from noise in experimental data, leading to better science, improving repeatability and helping scientists use far fewer resources. Yet, science today suffers from a problem of inadequate reproducibility, in part because of the immense complexity of the many systems in nature. AI opens a path to making science more reproducible. AI could also be used to generate ideas across the entire space of possible hypotheses surrounding a data set. Humans, machines, or both together, could then select and test hypotheses of interest. This would usher in a different style of discovery than occurs today.

AI in science still has limits.

AI is capable of solving narrowly defined tasks, but still faces difficulties in generalising those skills in a broader context. AI cannot yet read a scientific paper properly. Nor can it generate truly novel ideas. AI also needs to have knowledge codified. Laboratory robots must also become more capable, for instance in being able to adjust to variability in experimental settings. The development of formal descriptions of procedures would make automation easier. Work is underway to classify levels of autonomy of AI-enabled laboratory robots, as with the classifications developed for autonomous vehicles.

Advances in reasoning are essential for AI capabilities to become more generalisable across more varied situations.

There have been advances in AI's capability to carry out the Survey of Adult Skills (PIAAC) that measures key literacy and numeracy skills of adults. In 2016, the OECD asked eleven computer experts to rate the capabilities of AI to carry out the PIAAC test.

In 2021, this exercise was repeated with a different group of eleven experts, six of whom also participated in 2016. In literacy, the results suggested a considerable increase between 2016 and 2021, compared to human performance. Experts link this increase to a boom in language understanding technology in recent years, although AI has still not reached human-level performance on practical tasks. In the numeracy domain, on the other hand, expert ratings suggest that AI performance has remained stable.

Assessing AI capabilities with expert ratings on standardised tests, such as PIAAC, is useful but can have some shortcomings as these assessments often do not capture important social skills—such as the ability to process verbal directions and instructions from humans—that would be necessary to apply skills like literacy or numeracy in real-life settings.

Evaluations of AI capabilities should be linked to human skills.

In a discussion on the insights and limitations of the different ways to evaluate AI systems, speakers highlighted that since its early stages in the 1960s, AI research has relied on benchmarks and competitions to measure the state of the art and drive progress in the field, although research institutes such as the French Laboratoire National de Métrologie et d'Essais carry out formal evaluations.

A common limitation of these benchmarks and competition evaluation approaches is that they capture only part of the performance that is desired. As a result, research focused on training systems to do well on the measures can miss important parts of the problem.

> "We need to test for the capabilities of an AI system, not the ability of a system to perform on a specific test. [Otherwise] it is like having a school exam that tests only your ability to pass [the] school exam."
>
> – Lucy Checke, Lecturer, University of Cambridge.

Panellists agreed that – to be more useful for predicting AI's broader impact – AI evaluations should aim at capturing higher-level AI capabilities. A further limitation to using benchmarks and competitions is that they "have been designed by AI researchers for AI researchers."

Involving non-AI experts can support a broader understanding of problem requirements.

Individual experts rarely have expertise in all AI domains necessary to carry out a test task, making it necessary to gather ratings from experts with multiple types of expertise about AI.

AI could facilitate both small-scale science and large-scale research projects, although it is not yet clear if one effect will prevail. Some large-scale research projects using AI rely on vast computing power unavailable to many institutions.

Synergies between large and small projects could help overcome this issue e.g. small laboratories could use cloud computing to work on data generated from much larger and more expensive research programmes.

Research bodies can be slow to adapt to novel opportunities, and funding decisions sometimes reflect inertia. However, in a world where government budgets are under great pressure and global challenges loom, the role of AI in improving the efficiency and reproducibility of science should appeal to policymakers across the aisles.

> "In order to have policies that work, we have to measure what's happening. If we're not measuring it, there is absolutely no way that we can have transparency or enforcement."
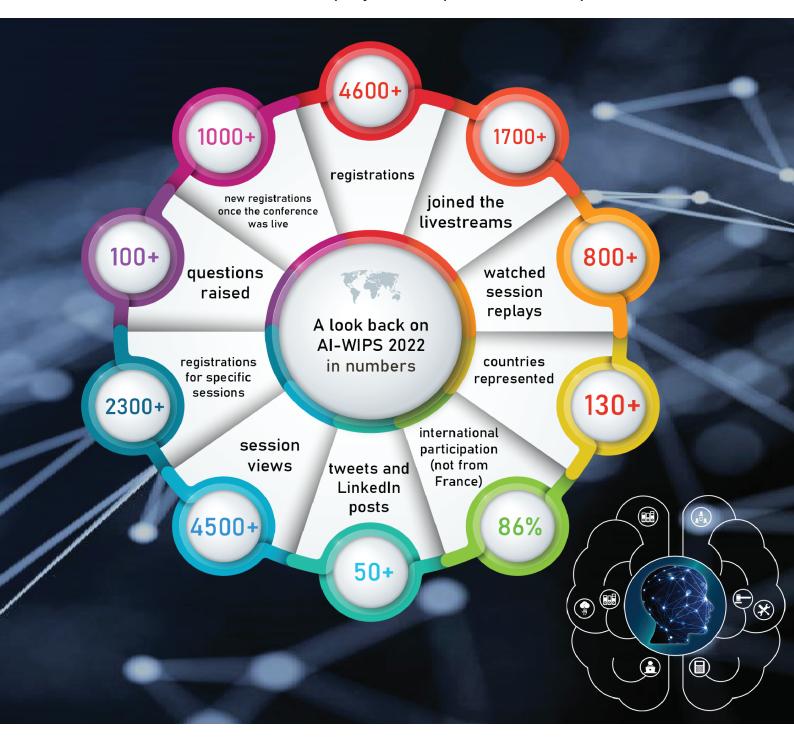>
> – Pam Dixon, Executive Director, World Privacy Forum

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Catch the replays on https://oecd.ai/wips

OECD

Federal Ministry of Labour and Social Affairs

A look back on AI-WIPS 2022 in numbers

4600+ registrations

1000+ new registrations once the conference was live

1700+ joined the livestreams

100+ questions raised

800+ watched session replays

2300+ registrations for specific sessions

130+ countries represented

4500+ session views

86% international participation (not from France)

50+ tweets and LinkedIn posts

Questions? Get in touch with the conference team at ai-wips-conf22@oecd.org