industriAll EUROPEAN TRADE UNION

Policy brief 2024

AI in the industriAll Europe world of work

An industrial policy approach

Brussels, 28 August 2024

Overview

Nowadays we are living in an interconnected world and a data-driven industry. The wide adoption of various digital technologies has led to a substantive shift in the way added value is created in the industry. AI has the potential to transform the production process, and the ways business is organised and impact industrial relations.

AI is massively used in the workplace and most of the time, it is not used alone but embedded in other systems. Syndex, in its study "*All eyes on artificial Intelligence*", identified different types of systems that could be found in the workplace:

- Assisted intelligence with humans in the loop are those AI systems that assist humans in making decisions or taking actions
- Automation, without a human in the loop, of manual and cognitive tasks – already existing - that are either routine or non-routine
- Augmented intelligence with humans in the loop, are those AI systems that augment human decision-making and continuously learn from their interaction (adaptive system)
- Autonomous intelligence without humans in the loop, are systems that can adapt to different situations and can act autonomously without human assistance

Application of AI in industry

The application of AI technologies across various industries, as can be seen above, focuses on three main objectives: optimising product development cycles, optimising complex operations, and informing the next best action for customers.

Figure 1 **Industries using reinforcement learning in various applications**

Industry	Application
Advanced electronics and semiconductors	Optimize silicon and chip design to increase performance and reduce manufacturing costs Optimize fabrication manufacturing process for improved yield and throughput
Aerospace and defense	Optimize engineering design processes to reduce time to market for new systems and improve quality
Automotive	Optimize design processes to shorten development cycle for new cars and features and improve quality Deploy advanced predictive maintenance to prevent rare failures and unplanned outages Deliver real-time production monitoring and controls to increase manufacturing yield
Mining	Optimize design process so teams can explore a grater range of mine designs for improving mine yield Use intelligent process controls for managing power generation and bore milling to increase yield and reduce costs Apply holistic logistics scheduling to optimize mine-to-shipping operations and reduce costs
Oil and gas	Enable real-time well monitoring and precision drilling for increased yield Optimize tanker routing to reduce costs and ensure on time delivery Enable advanced predictive maintenance to prevent rare equipment failures and unplanned outages
Pharmaceuticals	Optimize drug discovery, identifying molecules of interest faster to reduce the time and cost of research and bring new therapies to market faster Automate chemistry, manufacturing, and controls (CMC) to maximize batch yield and quality Optimize biological methods to reach peak production output
Telecom	Optimize network layout to maximize coverage and minimize power consumption Manage networks in real-time to optimize service quality and reduce downtime Apply advanced personalization to increase cross-sell an upsell revenue

Optimizing product development cycles (AI-assisted design) Optimizing complex operations Informing next best action for each customer

Sources: Statista/McKinsey.

High-tech industries such as electronics, aerospace, and automotive are focused on reducing development time and improving product quality, while resource-intensive sectors like mining and oil and gas use AI to boost efficiency and cut costs. In contrast, pharmaceuticals and telecom are more focused on leveraging AI for innovation and customer engagement, respectively. These sector-specific trends illustrate how AI is adapted to meet the demands and strategic goals of different industries. By analysing these trends, it becomes clear that while AI technologies have diverse applications, the core focus across industries remains enhancing efficiency, reducing costs, and driving innovation.

The Commission estimated that AI is poised to significantly impact manufacturing and the Industrial Internet of Things (IoT), with an estimated economic impact of up to €200 billion by 2030. In industrial sectors in particular, AI solutions are becoming ever more important as they help to optimise production processes, predict machinery failures and develop more efficient smart services.

The European Commission has been proactive in promoting the development and deployment of trustworthy Artificial Intelligence (AI). Their approach is centred around ensuring that AI technologies are ethical, transparent, and beneficial to society as a whole. In April 2019, the High-Level Expert Group on AI, set up by the European Commission, published "*Ethics Guidelines for Trustworthy AI*." According to the guidelines, trustworthy AI should respect these three characteristics for all its life cycle:

a. **lawful** - respecting all applicable laws and regulations
b. **ethical** - respecting ethical principles and values
c. **robust** - both from a technical perspective while taking into account its social environment

The guidelines provide a framework for achieving Trustworthy AI. In order to meet the requirement cited above, the guidelines specified 7 ethical principles to help verify if the AI system could be considered trustworthy:

- Human Agency and Oversight
- Technical Robustness and Safety
- Privacy and Data Governance
- Transparency
- Diversity, Non-discrimination, and Fairness
- Societal and Environmental Well-being
- Accountability

Beyond principles, guidelines and recommendations, the European Commission in 2021 came up with a proposal for the first legally binding rule on AI worldwide: the Artificial Intelligence Act. It aims at assigning AI applications to four different risk categories: applications that pose an unacceptable risk and are therefore prohibited; applications that pose a high risk and need to be subject to specific AI requirements and a conformity assessment; applications that pose a minimal risk and are principally permitted, but subject to transparency obligations; and applications that pose no risk at all. Workers' rights and involvement in decisions linked to the introduction of high-risks AI at the workplace are also addressed in the European AI Act which foresees:

- A duty to inform workers and their unions before introducing high-risk AI systems to the workplace
- A duty to carry out an assessment of the impact of high-risk AI on fundamental rights

The AI Act is a market regulation that will regulate the new AI systems entering the EU Single Market. It is intended to support the development of new technologies with clear rules by making sure that the AI system can be trusted. The push to regulate the advancement of those technologies came from the mistrust that people had towards the AI systems (The Dutch Scandal) and the possible slowdown in the uptake of those technologies, risking leaving the EU behind China and the US.

The AI Act not only regulated the more 'traditional' AI technologies, but the negotiation took a speedy revamp in late 2022 with the entering into the market of the Generative AI (ChatGPT) that was a game-changer.

i. AI Standards

Much room for manoeuvre will be left to AI Standards that are being developed at the time of writing. Standards play a crucial role in EU legislation as they promote consistency, safety, and harmonisation across Member States. Technical standard setting is a key aspect of the EU's strategy to shape globalisation and support the single market.

Traditionally, standards have focused on market products, developed by and for industry. However, in recent decades, standardisation bodies have adapted to the evolving economy, now drafting standards on Social Responsibility (EN ISO 26000), Artificial Intelligence, and Digitalisation. These new areas of

standardisation increasingly address workers' issues, marking a significant shift from the past. It is important to recognise that new standardisation initiatives affecting workers and trade union matters can contrast with the traditional aims of standardisation and the European Social model. Trade unions must play an active role in these processes to protect and advance workers' rights within the evolving framework of EU legislation. For instance, the AI Act, a market regulation, will impact products used in the workplace. Therefore, it is crucial for trade unions to be involved in the standardisation process to ensure that standards maintain the highest quality working conditions and respect social dialogue and collective agreements.

i. AI liability

The question that more often arises among workers is about the liability of the AI systems that are placed on the market. The European Commission published in 2022 the Artificial Intelligence Liability Directive which is designed to complement the existing Product Liability Directive and create a cohesive legal environment to address the risks and damages associated with AI technologies.

AI systems are increasingly integrated into workplaces, from manufacturing robots to **decision-making algorithms in HR.** Ensuring that these systems are reliable and safe is crucial for protecting workers from accidents and health risks. In the event of an incident caused by AI, workers need a clear path to seek compensation and hold the responsible parties accountable. The AI Liability Directive aims to clarify who is liable when AI systems malfunction or cause harm, ensuring that workers are not left without recourse.

The proposed directive defines the types of AI systems covered and the scenarios under which liability would be triggered. It typically includes high-risk AI systems, as categorised by the EU AI Act. For certain high-risk AI systems, the directive may impose strict liability on producers or operators, meaning they are responsible for damages regardless of fault or negligence. The directive addresses also the difficulties of proving fault in complex AI systems. The law would introduce a presumed causal link between an AI company's non-compliance with AI safety rules and the damage suffered by a claimant, besides giving courts new powers to look at the algorithm. Companies will still be able to push back against that.

ii. Algorithm management

As mentioned before, several AI systems impact the work life of workers. The most disruptive one and visible is algorithm management which introduces several significant considerations and challenges. As AI systems and algorithms become increasingly integral to workplace operations, they influence how work is organised, managed, and evaluated.

- Algorithms can track and analyse workers' performance and behaviours in real time,
- The use of algorithms to make decisions about task allocation, performance evaluations, and even promotions can reduce workers' control over their worklife
- Algorithms may inadvertently perpetuate or even amplify existing biases present in the data they are trained on
- The "black box" nature of many algorithms, where decision-making processes are not transparent, can make it difficult for workers and unions to understand and challenge decisions made by AI systems

Existing labour laws and regulations, such as the new EU AI Act or EU Liability Directive do not fully address the complexities introduced by algorithm management in the workplace. There is a need for updated regulations that specifically address the use of algorithms in employment decisions, ensuring fairness and accountability.

Impact of AI on employment

Globally, McKinsey & Company estimates that AI has the potential to deliver additional total economic activity of approximately $13 trillion by 2030, with $1 trillion in value remaining to be captured from the industrial sector. By 2030, the net impact of AI on Europe's economy is projected to contribute an additional EUR 600 billion to a previously estimated EUR 2.8 trillion[1].

Figure 2

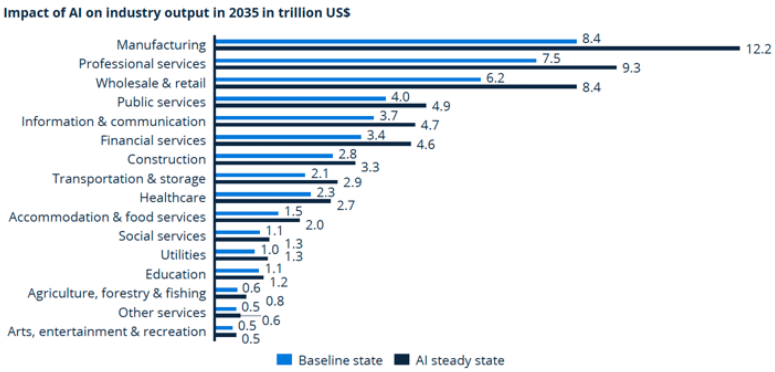
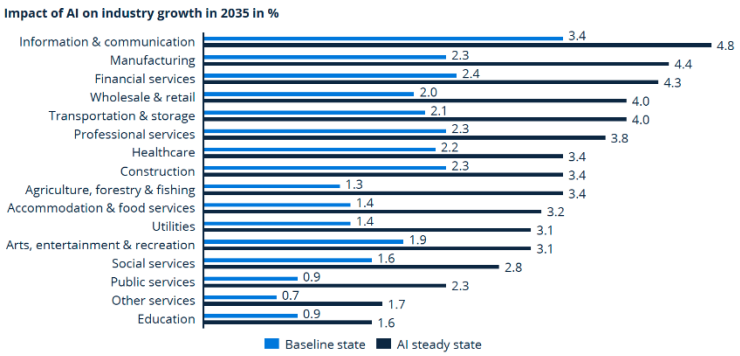


Figure 3



Source: Syndex Report: All eye on Artificial Intelligence

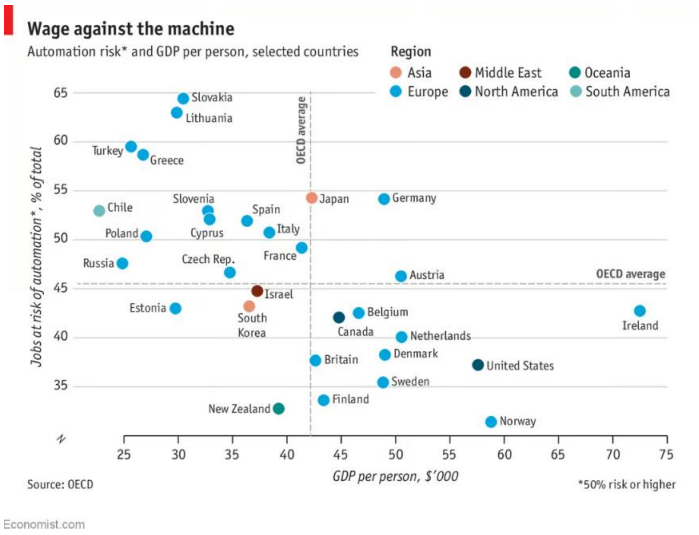
The graphs collectively illustrate the predicted economic benefits of AI integration across various industries by 2035. The first graph highlights the potential increase in industry output, while the second graph emphasises the accelerated growth rates that AI can bring. Both graphs underscore the transformative impact of AI, suggesting substantial economic gains and enhanced industry growth with AI adoption. This technological shift will also significantly affect jobs and skill sets in ways that are not yet fully anticipated and understood. The impact of AI on **employment volumes** is hard to predict. While there is a prevalent fear that a large number of jobs are at risk, it is important to note that the real danger lies not only in the disappearance of jobs but in their evolution.

At EU level, the take-up of AI is one of the most pressing and crucial elements of digitalisation in the EU. However, according to the Digital Decade 2024 Report, the adoption of this technology has marked the least progress in 2023. No improvement is perceptible compared to 2021. From 2021 to 2023, the percentage of enterprises using AI saw little change, increasing slightly from 7.6% in 2021 to 8% in 2023. The EU has recently adopted AI innovation package, which will facilitate the creation of AI factories, built around European public supercomputers, bringing together AI-dedicated supercomputers, and associated data centres connected via high-speed networks. As pointed out in the Syndex study the impact on productivity gains is too fragmented to be conclusive at this stage.

[1] Digital Decade Report 2024

There are various studies with differing conclusions on the impact of **automation on employment volumes**. The optimistic view suggests that more jobs will be created than destroyed, while the pessimistic perspective predicts massive job losses, with 70% of current tasks potentially being automated by 50%. However, all these studies agree on the potential risks, such as an increased gender gap, heightened anxiety among workers, and a widening disparity between high-income and low-income countries and job/skills polarisation.

Figure 4



AI will affect workers differently depending on their occupational exposure to the technology and the extent to which it will automate or augment their work. The extent and nature of the exposure to AI in different occupations could in turn determine its effects on labour demand and wages. The study from the OECD finds large variation across countries: jobs in Slovakia are twice as vulnerable as those in Norway. In general, workers in rich countries appear less at risk than those in middle-income ones. But wide gaps exist even between countries of similar wealth.

The Syndex study "*All Eyes on Artificial Intelligence, tacking digitalization and AI on the workplace* " highlights the lack of consensus on predicting productivity gains. According to a *McKinsey study*[2], it was that the potential total additional income could be from $2,600 to $4,400 billion dollars/year. Nevertheless, as mentioned before, this additional profit from automation will not necessarily benefit all stakeholders. Workers' representatives and employers must collaborate to ensure these gains do not result in redundancies but rather in better jobs and training opportunities.

Skills needs

As we navigate the complexities of the digital era, the acquisition of digital skills is a pivotal issue. The Digital Decade 2024 Report highlights critical insights into the state of digital skills across the EU, underscoring both progress and persistent gaps. According to the Digital Decade 2024 Report, in 2023, slightly more than 55.6% of individuals reported having at least basic digital skills, with variations across Member States, ranging from 82.7% to approximately 27.7%. The EU average level of basic digital skills in 2023 increased by only 1.7 percentage points compared to 2021, a rate insufficient to meet the 2030

[2] It can be found in the Syndex Report: "*All eye on Artificial Intelligence, tacking digitalization and AI on the workplace*", 2024

target. The EU is currently 4.2 percentage points below the ideal 2023 value needed to stay on track toward the 80% target by 2030. Without further action, projections estimate that only 59.8% of the population will have at least basic digital skills by 2030.

The digital skills gap extends beyond the older population, affecting the younger generation as well. Approximately 30% of individuals aged 16-24 lack basic digital skills. While the gender gap in basic digital skills is narrowing (55% of females versus 57% of males), significant disparities remain based on education level (80% of individuals with high formal education versus 34% with no or low formal education) and geographic location (63% of people living in cities versus 48% in rural areas).

The demand for ICT professionals has increased over the past years, while the number of ICT professionals available has decreased, resulting in a gap which is growing at an alarming rate. In 2023, nearly 9.8 million ICT specialists were contributing to the EU's employment representing an annual increase of 4% compared to 2022. However, in 2023, the EU was 0.9 million specialists below the value that would be needed to be on track towards the 2030 target. According to the current trend, the number of ICT specialists in the EU will be around 12 million in 2030 if no further intervention is put in place. The gender gap is still substantial and persisting. In 2023, just 19.4% of ICT specialists employed in the EU were women, also undermining how digital solutions are designed and deployed, with proven negative consequences for social equality and welfare overall.

Figure 5

Source: Digital Decade Report 2024

These issues are projected to increase and be exacerbated by the global race for digital talents. For example, the demand for professionals working in AI development and deployment has increased by 33% from 2019 to 2022 in selected OECD countries.

AI ACT

Art. 4: AI Literacy

This article states that companies that develop and use AI systems must ensure that their employees, and anyone else who operates or uses these systems on their behalf, are well educated about AI. This includes considering their technical knowledge, experience, education and training, as well as the context in which the AI systems will be used and the people or groups who will be using them.

The inclusion of AI literacy in the AI Act is a critical step towards preparing the workforce for an AI-driven future. By understanding AI systems, workers can better navigate technological changes, enhance workplace safety and efficiency, and protect their rights.

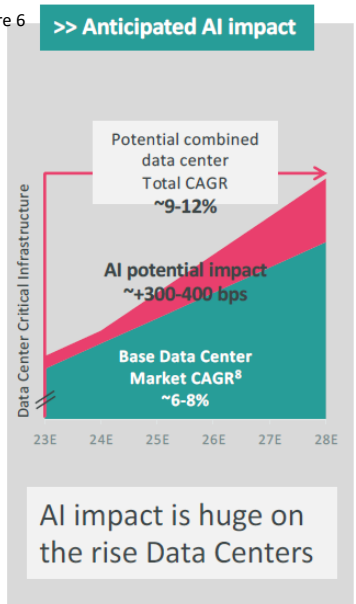
AI and Blind Spots

AI is frequently praised for its potential to revolutionise industries, enhance energy efficiency, and drive innovation. However, within the excitement surrounding these advancements, it's crucial to address a series of blind spots that accompany the deployment of AI technologies, a concern raised in the Syndex study *"All Eyes on Artificial Intelligence, tacking digitalization and AI on the workplace "*.

i. Energy paradox

In the current economic and political context, securing energy supply is a big concern. We have seen some temporarily reverting to fossil fuels, in the absence of alternative solutions. However, we have to keep the compass set on the long-term objective - climate neutrality by 2050. These measures should align with long-term objectives such as reaching climate neutrality through Just Transition and building Europe's open strategic autonomy. In that debate, digitalisation and robotics are essential. Digitalisation could be a key enabling technology to support energy efficiency thanks to the combination of AI systems and big data. However, while AI systems could contribute to improving energy consumption, there is the paradox of energy-intensity AI systems. Today, Data Centres consume 2% of the world's electricity. This share is set to double between now and 2026.

Figure 6



8. Management estimates, Omdia, 451 Research, IDC, and Dell'Oro.
Source: Vertiv, Investor Conference, November 29, 2023.

AI relies on chips and data centers, both of which bring significant concerns regarding the energy transition. The production of chips is problematic due to high energy consumption, challenges in waste recycling, and extensive water usage. The chip industry, far from aligning with the Paris Agreement on climate change, is instead seeing rapid growth. The digital sector currently accounts for 7-9% of global electricity consumption, projected to rise to 13% by 2030 due to growing demand for Internet services and AI. Reducing the energy consumption of digital services is crucial. Currently, the recycling of digital devices is limited, with only 10.4% of people recycling their mobile/smartphones, and slightly higher percentages for laptops/tablets and desktop computers.

Data are a critical input for software. Software and Data require a physical (tangible) AI infrastructure, most importantly computing power and capacity (semiconductor - chips) and also connectivity.

ii. Tangible Infrastructure and connectivity

As is common in the high-tech industry, marketing often portrays AI as something abstract, similar to concepts like the cloud or wireless networks. However, in reality, these technologies depend on tangible infrastructures. In other words, AI relies on real, physical infrastructure, placing the industry at its core. The EU is far from achieving its connectivity targets set out in the EU Digital Program. The European Union's Digital Decade strategy aims to empower businesses and people through a human-centred, sustainable digital transformation. Key targets for 2030 include having 20 million ICT specialists, ensuring 80% of the

population possesses basic digital skills, and achieving 75% of EU companies using cloud, AI, or big data technologies. Furthermore, the strategy seeks to double the EU's share in global semiconductor production and ensure that more than 90% of SMEs reach at least a basic level of digital intensity.

Fiber and networks are crucial for gigabit connectivity, and they reach only 64% of EU households, compared to over 99% in Japan and South Korea. Despite significant progress in some Member States, the average annual progress in the EU (+13.5%) is insufficient to ensure 100% coverage by 2030. Without additional action and investment, less than 90% of the target will be met by 2030. Additionally, only 18.5% of households have adopted gigabit connections and high-quality 5G coverage extends to just 50% of EU territory, with most 5G deployments not being standalone. Achieving connectivity targets requires an estimated investment of EUR 200 billion.

iii. Click workers

Despite the AI impact on the visible workforce, one significant aspect of transformation that AI systems are bringing is the rise of *click-workers* — individuals who perform small, repetitive tasks – such as feeding data in the algorithm.

A growing quantity of human labour is required to support AI. Those workers are essential to train the AI systems. They engage in tasks such as data labelling, image recognition, content moderation, and transcriptions. This emerging workforce, which ranges [3]from 154 million to 435 million of online workers all around the world, is critical for the functioning and development of AI technologies, but it also raises numerous economic, social, and ethical concerns.

In general, platforms do not provide formal employment to these workers. They are treated as a disposable workforce, lacking real employment contracts and being paid by the piece – or click. Moreover, click-workers can operate remotely from anywhere, exposing them to global competition and driving down their wages.

Figure 1 Global flows of annotated data from microwork providers to AI solution providers

Source

[3] Working without borders. The Promise and Peril of Online Gig Work. World Bank 2023

Biased

An algorithm works with data and an AI system simply presents the results of calculations and data collected, at some point at least, by humans, mostly click workers. Consequently, algorithms "*reflect and deal with the human biases that are built in when they are programmed, when they process data and when humans interact with them*[4]." Syndex in their report[5] described cognitive biases as repeated patterns of thought that lead to inaccurate and subjective conclusions. An algorithm alone cannot create bias as it does not have the human intelligence or culture to understand the concept of discrimination. Yet, biases in the training data (input from humans) can be reflected in the output of the models, leading to discriminatory or unfair results. The lack of contextual understanding and empathy limits the ability of systems to handle sensitive human interactions.

In companies, biases concerning one area of AI can have deleterious effects on workers: **algorithmic management.**

AI and Investment

Investment priorities should focus on making the European industry resilient, green, and innovative while maintaining and expanding quality, secure jobs, and a skilled workforce.

In 2019, the EU invested between €7.9 billion and €9 billion in AI, which marked a 39% increase from 2018. The EU aims to reach an annual AI investment target of €20 billion by 2030, and trends suggest this target might be met ahead of schedule. With the hype surrounding AI, and in particular generative AI, one can fear the emergence of a speculative bubble, given the amounts invested in companies in the sector and the funds allocated by the world's leading incubators. Billions are being sunk into AI companies, but the question of viable business models will soon arise.

While public funds remain a major leverage for AI investments, social conditionalities in terms of workers' involvement, human in control, quality employment, job creation, sustainable value chain as well as environmental impact.

[4] Council of Europe (2023), *Study on the impact of AI systems, their potential for promoting equality, including gender equality, and the risks they may cause in relation to non-discrimination.*
[5] Syndex Report: "*All eye on Artificial Intelligence, tacking digitalization and AI on the workplace*", 2024