Technology, Work and Society

Highlights from the CES 2024 Annual Report

Spanish Economic and Social Council (CES)

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Road map

- **Chapter I** — Economic Impacts of Technological Change
- **Chapter II** — Labour Impacts of Technological Change
- **Chapter III** — Social Impacts of Artificial Intelligence

Chapter I

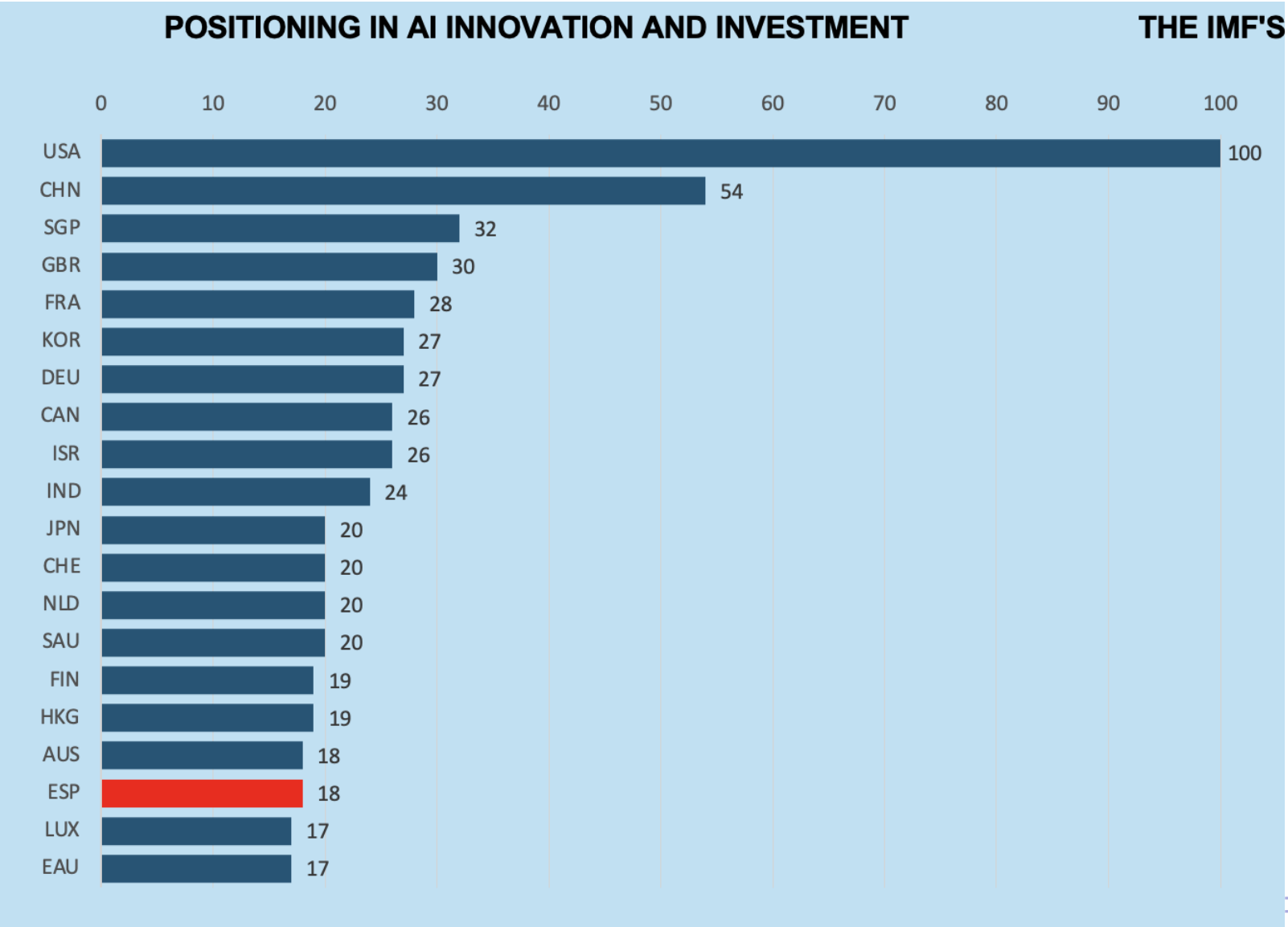
Economic Impacts of Technological Change

The Fourth Industrial Revolution

- We are living through a Fourth Industrial Revolution driven by **artificial intelligence, digitalisation, and big data**.
- This transformation is **faster, broader, and deeper** than previous ones.
- It raises major **ethical, social, and geopolitical challenges**.

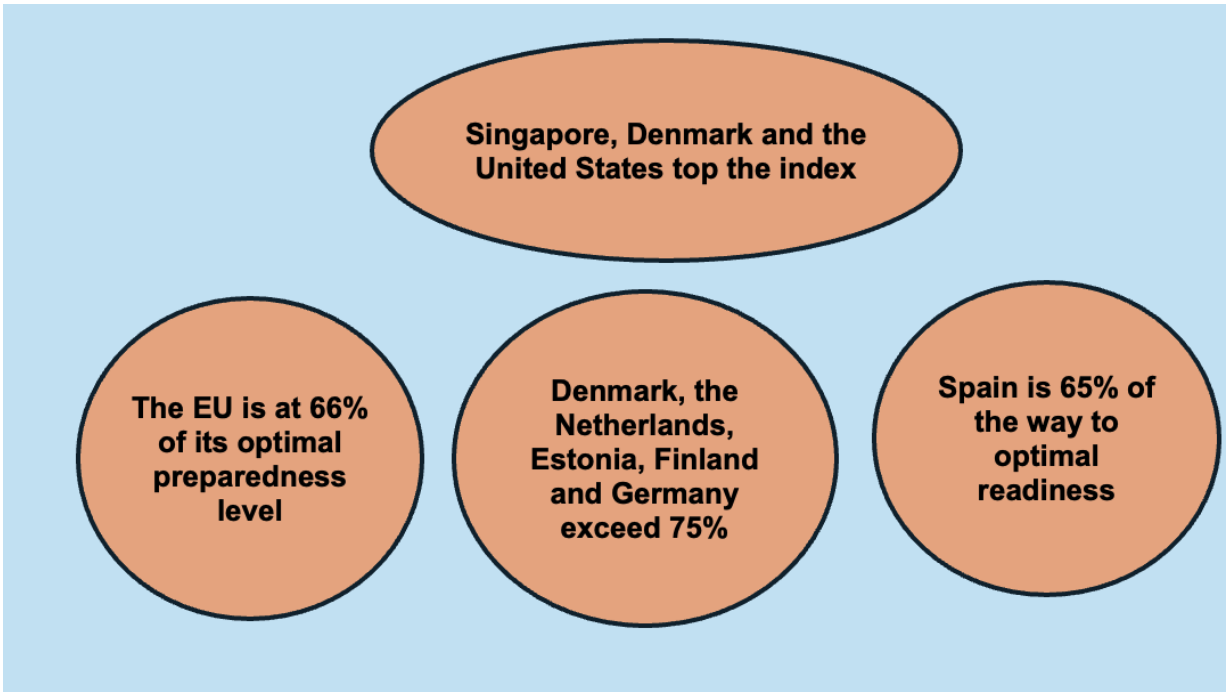
Global AI Landscape

- US and China lead; Spain performs moderately well for its scale.



AI Preparedness (IMF AIPI)

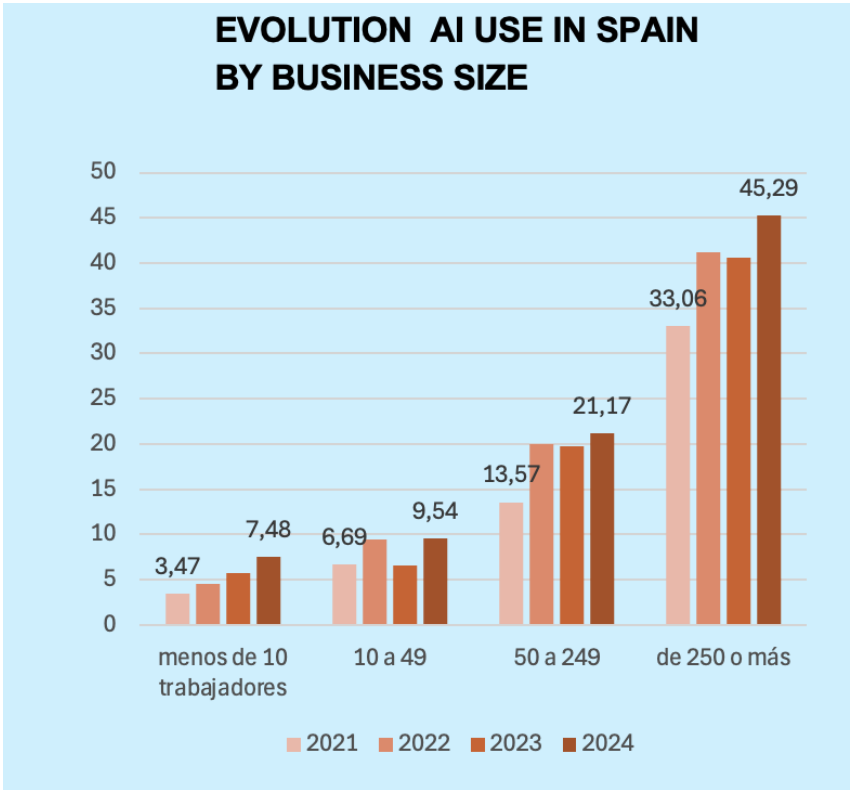
- It measures preparedness based on indicators related to: digital infrastructure, innovation and economic integration, human capital and the labour market, regulation and ethics.
- Spain below EU leaders; room to improve human capital and R&D.
- Goal: maximise benefits while mitigating risks.



Advanced Digital Uses & AI Adoption (Spain)

AI adoption rises with firm size (micro $\rightarrow$ large). Notable growth in the adoption of AI by Spanish companies.

- Service companies make the greatest use of AI in their activity, at 15.6%.
- Large industrial companies are the most intensive users of AI, at 48%.
- The main application of AI is in marketing and sales



Gaps: Situation and Challenges

- **Digital divides** persist and may limit AI development.
- Connectivity still limited in some **rural/low-density areas**.
- **SMEs** generally use AI less intensively than large firms.
- Need for greater **awareness, literacy, and promotion** among small businesses.

Cybersecurity & Human Oversight

- Exposure of citizens and firms to cyber threats is **increasing**.
- AI helps detect/respond to attacks, but also enables **more sophisticated** crimes.
- AI poses an **economic-financial and technical** challenge in cybersecurity.
- **Human oversight** is essential to ensure balanced and ethical AI use.

R&D&i and AI for Science

- Spain has focused efforts on promoting **R&D** for AI development.
- AI is **revolutionising R&D processes**.
- Advantages: analyse large datasets, **automate hypotheses**, model complex phenomena, optimise experimental designs, **validate results**.
- Proven potential in **engineering, biotechnology, pharmacology**.

Economic Policy in Favour of AI

- A **comprehensive strategy** with clear and transparent rules should balance accelerated technological development with the protection of **fundamental rights**.
- **Objective:** ensure benefits reach society at large and **no one is left behind**.

Conclusions — Chapter I

- Steer technological transformation—especially digitalisation and AI—towards **human, social and environmental** progress.
- Adopt a **comprehensive, society-wide strategy** covering development, deployment and use; involve public/private sectors, experts and citizens.
- **Maximise benefits and minimise risks** through sound governance, ethics and evidence-based policies.
- Build a **broad social consensus** on AI uses, limits and human–technology interaction.
- Aim to make AI a driver of **stable, sustainable and inclusive** development in the medium term.

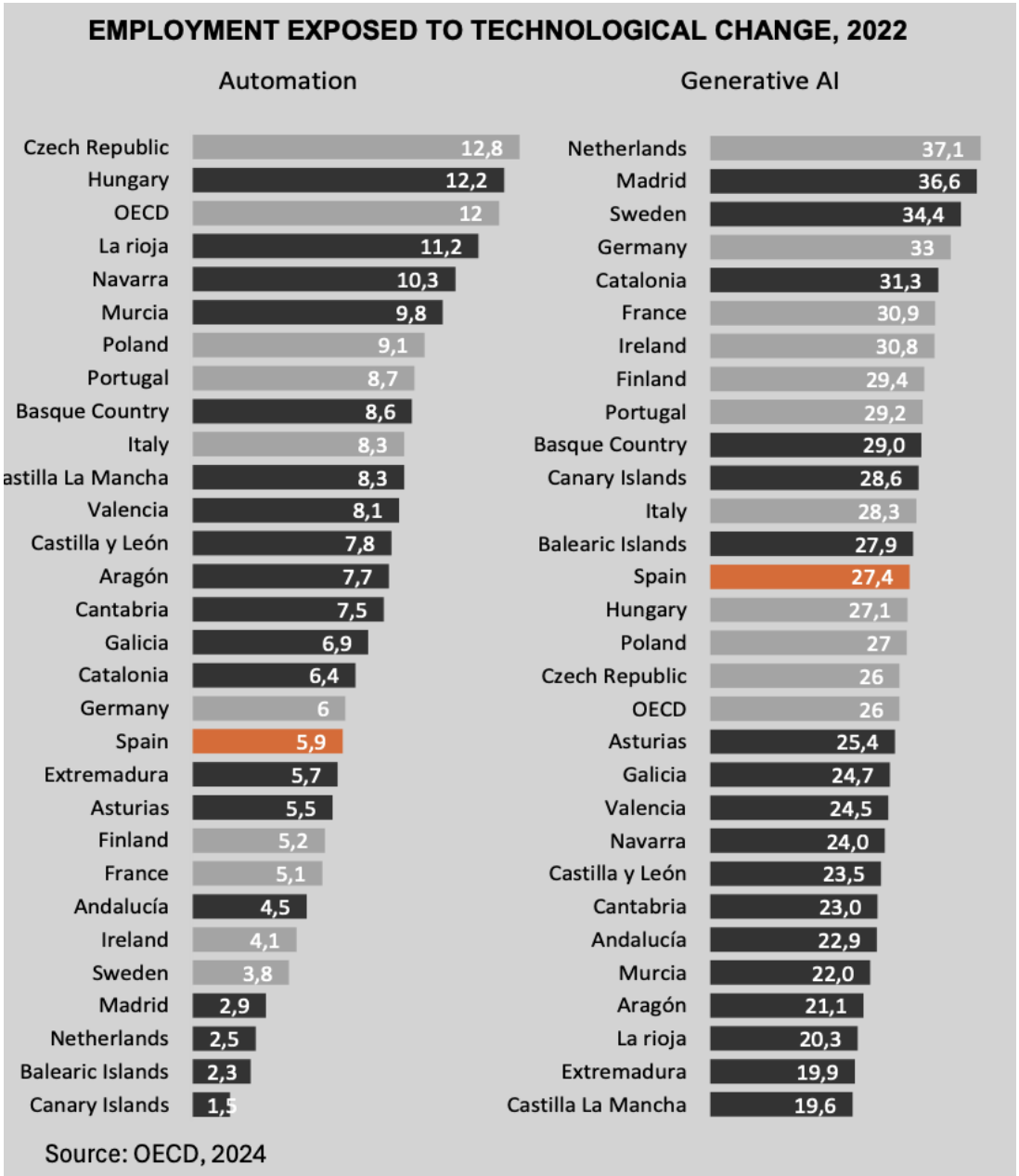
Chapter II

Labour Impacts of Technological Change

Labour Impacts: What Changes?

- Quantitative and qualitative effects on employment (jobs, tasks, skills, wages, job quality).
- Three channels: *productivity gains*, *task displacement*, and *new complementary jobs*.
- Focus of the chapter: volumes, wages, and who is **most exposed** in Spain.

Employment Exposed to Technological Change



How to Read Exposure

- **Exposure $\neq$ job destruction**: mainly linked to potential productivity improvements with GenAI.
- New jobs often emerge in *different sectors/regions* and require *different skills*.
- Policy priority: **reskilling/upskilling** to manage transitions fairly.

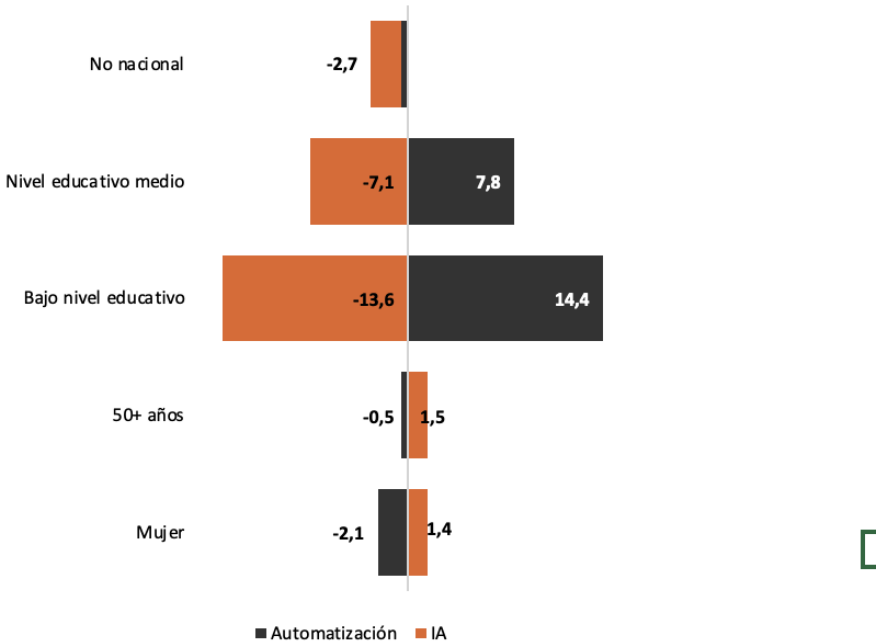
Regional Disparities

- Highest exposure: **Madrid** (36.6% GenAI). Lowest: **Castilla-La Mancha** (19.6%).
- Pattern reflects sector mix (tech, finance, telecoms, public sector) and digital intensity.
- Implication: **territorially tailored** training and ALMPs.

Who is More Exposed? (Worker Profile)

Education: Automation exposure higher for low/medium education; GenAI exposure tilts toward higher skills. **Gender & Age**: Women more exposed to GenAI and less to automation; 50+ slightly more to automation.

GRAFICO 11. CARACTERISTICAS DE LOS TRABAJADORES EN OCUPACIONES MAS EXPUESTAS AL CAMBIO TECNOLÓGICO (En puntos porcentuales)



Nota: el gráfico muestra los coeficientes de una regresión logística que controla por edad, sexo, nacionalidad y nivel educativo. Los coeficientes representan el efecto marginal (es decir, el cambio medio en la probabilidad). Por ejemplo, las mujeres en 2023 tienen, aproximadamente, 1,4 puntos

Active Labour Market Policies (ALMPs)

- **Profiling & personalisation**: data-driven segmentation and tailored pathways; chatbots for guidance.
- **Matching & skills**: detect gaps, map to training, competence-to-vacancy matching, prospective labour analysis.
- **Safeguards**: responsible AI use in services; minimise unintended harms; equity-by-design.

Governance: Social Dialogue and Collective Bargaining

- EU **AI Act** and **Platforms Directive**: transparency, human oversight, risk management at work.
- **European Social Dialogue**: AMED (2020); sectoral dialogue as a lever for transitions.
- In Spain: **V AENC** promotes clauses on technological transition;

Conclusions — Chapter II

- **No large net losses expected**, but a deep **transformation of work** is underway.
- Prioritise **skills adaptation** (re/upskilling), accounting for **territorial and individual heterogeneity**.
- Target **most vulnerable regions and groups** with tailored training and transition policies.
- Ensure a **shared governance** of change: social dialogue, clear rules, and **reliable, responsible AI** at work.
- Aim for **inclusive and sustainable** development: maximise digitalisation's benefits in employment and industrial relations.

Chapter III

Social Impacts of Artificial Intelligence

People-centred Digitalisation and AI

- AI should improve **well-being**, **sustainability** and the 2030 Agenda.
- High potential in public services; also **risks** (fundamental rights, environment, liability).
- Manage the tension between **promise** and **precaution** through clear governance.

Safe, Reliable and Human-centred AI

- Principles: **human oversight**, safety, **accountability**, privacy, **transparency**.
- EU AI Act: duties by risk level; excludes low-risk uses from prior assessment.
- Goal: trustworthy AI delivering **socially beneficial** outcomes.

Algorithmic Governance, Transparency & Accountability

- Decisions aided by algorithms must be **visible, knowable, auditable**.
- Counter risks of **opacity**, bias and error; support registries and audits.
- Clear allocation of **responsibility** and **human oversight** in critical uses.

Non-discriminatory AI: A Gender-aware Approach

- Reduce **gender bias** by design; monitor and control discrimination.
- Combine enforcement, independent audits and **greater participation of women**.
- Address other risks of bias (e.g., ageism) with prevention and redress.

Education: Opportunities & Challenges

- **Opportunities**: free teachers from routine tasks; visualise results; personalise learning; support SEN.
- **Challenges**: errors/biased content; inequality and digital poverty; privacy & copyright; teachers need training.
- Require collaboration and **governance** across stakeholders.

AI for More Inclusive Social Services & Benefits

- **Opportunities**: updated data, inter-administrative connections, faster detection of needs.
- **Outcomes**: more **effective**, **equitable** and responsive services.
- Guardrails: rights, transparency and **public confidence** in institutions.

AI & the Ecological Transition

- **Opportunities**: efficiency, circularity, smarter mobility/energy, better resource allocation.
- **Challenges**: energy/material footprint; unequal distribution of environmental costs/benefits.
- Ensure **equitable green** outcomes and limit environmental impact.

Conclusions — Chapter III

- Make AI **people-centred, trustworthy** and aligned with social and environmental goals.
- Deploy in education, Social Security and social services with **safeguards** and continuous evaluation.
- Strengthen **governance, transparency and participation** to maximise benefits and minimise risks.

Thank you