



Automation, digitalisation and algorithmic decision-making

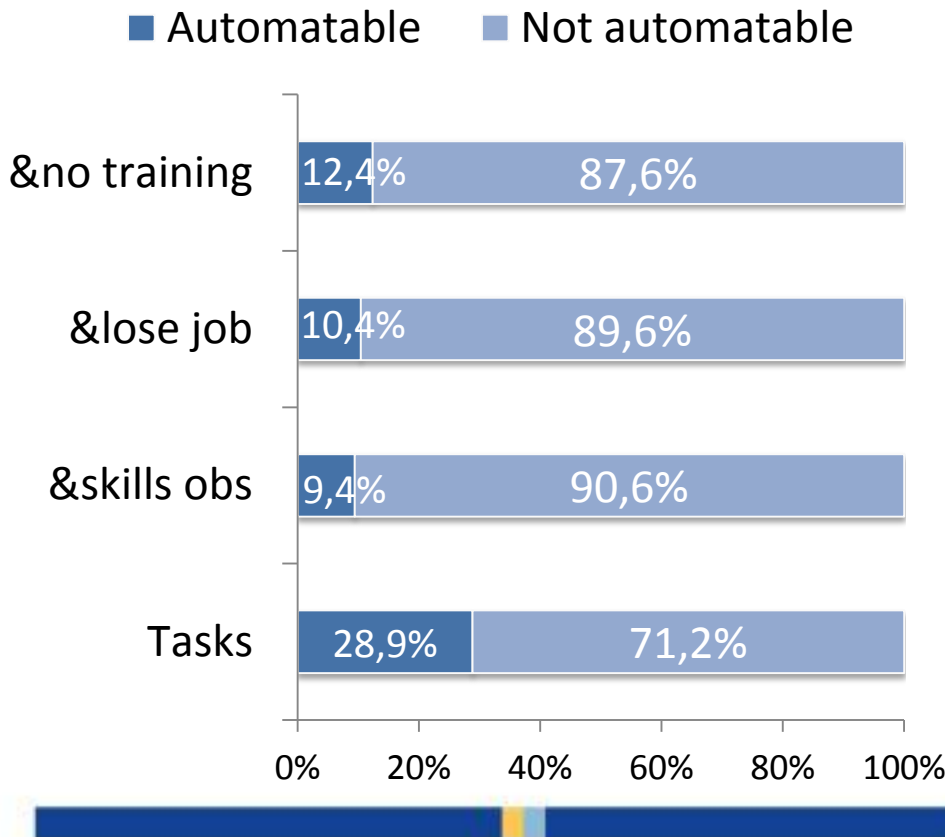
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'European group on ethics in science and technologies'
Open roundtable on the future of work
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Risk of automation for the most vulnerable...

* Automatable jobs defined as cluster of jobs involving higher frequency of routine tasks and low importance of communication - team working – problem solving - planning skills



Odds of being in automatable job

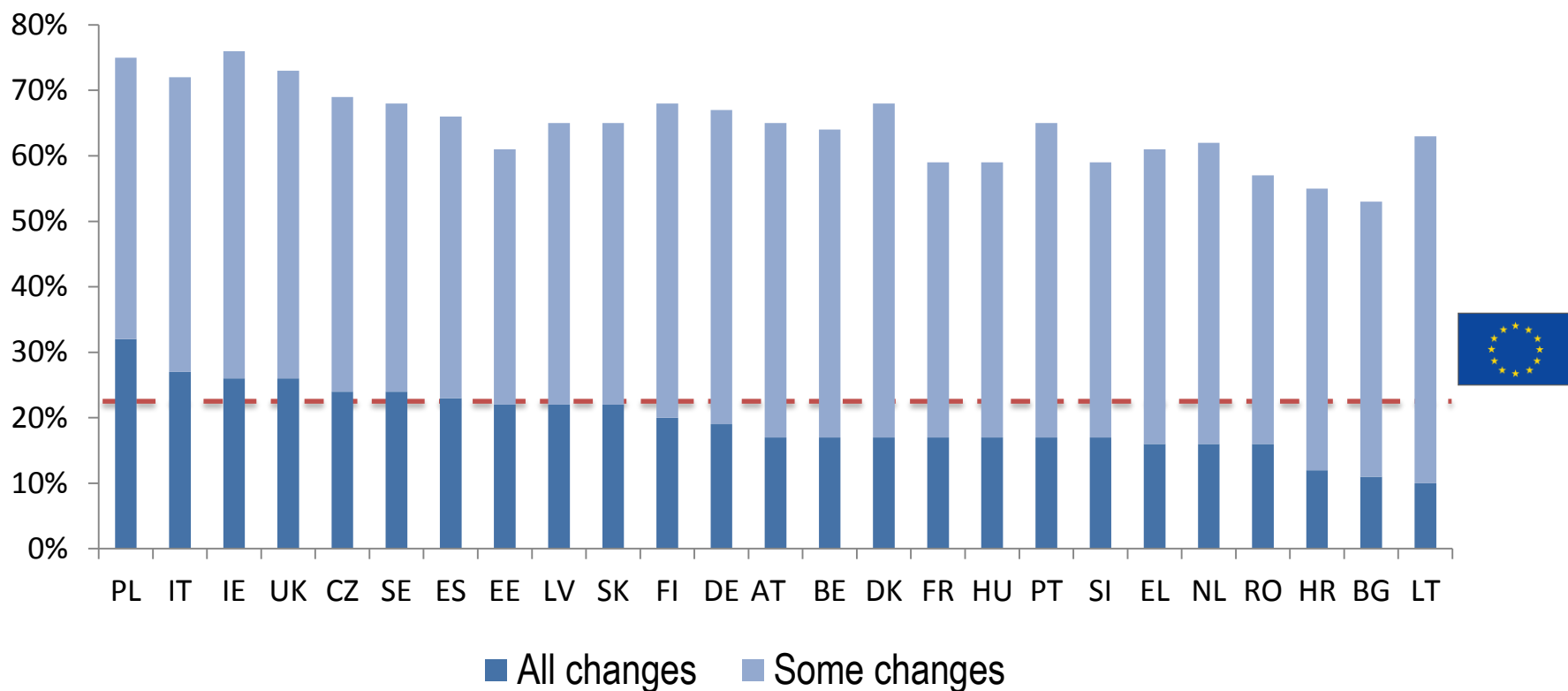


Source: Cedefop European skills and jobs survey (ESJS)

<http://www.cedefop.europa.eu/en/events-and-projects/projects/european-skills-and-jobs-esj-survey>

More supportive CVET needed

% adult workers who experienced changes (e.g. in technologies used) in workplace and were **supported** by training activities paid for by the employer



** Share of automatable jobs (tasks & no training) within 2-digit occupations*

Cleaner or Helper	48%
Agricultural, Forestry, Fishery Labourer	45%
Street and other Sales or Services Worker	36%
Labourer in Mining, Construction, Manufacturing	29%
Food Preparation Assistant	22%
Driver or Mobile Plant Operator	22%
Plant or machine operator	21%
Assembler	21%
General or Keyboard Clerk	18%
Personal service worker	18%
Protective service worker	16%
Sales worker	15%
Average	12%

Personal care worker	10%
Customer services clerk	9%
Science and engineering professional	6%
ICT professional	6%
Teaching technician	6%
Health technician	3%
Teaching professional	3%
Administrative or Commercial Manager	3%
Chief Executive, Senior Official or Legislator	2%
Production or Specialised Services Manager	2%
Health Professional	1%

Implications for education and training

The promise

- Fast-deep LMI
- Skills matching
- Reskilling

- 'Individualisation'
- Massive, online, open
- Non-credentialism
- New learning platforms



The challenge

- Biases
- Inequality

- Homo adaptus
- Quality assurance
- EQF responsiveness
- Governance
- 'Personalisation'
(learning & career guidance)
- Humans-in-command

Robots in education and training

- Real-time feedback
- Self-directed learning
- Experiential

- Improvement in problem solving, logical thinking, scientific inquiry
- Social skills?

But

- Critical role of teachers
- Facilitation
- Evaluation



Human discretion!



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BRIEFING NOTE

PEOPLE, MACHINES, ROBOTS AND SKILLS

Technological unemployment is a recurring theme, but joblessness in the digital age will depend on human, not artificial, intelligence.

Why? Because that nearly half of jobs in advanced economies may be substituted out of existence, even as the world's labour force grows by 1.5 billion people by 2030. Economic growth may be slow, but it will still be there. It is largely by workers that people will offset their loss of jobs to robots and machines, or be able to find new work in the new digital age.

Change is coming. However, Cedefop's European Skills and Jobs Survey (ESJS) 1) finds that across the EU, Member States, 42% of adult employees have seen the technologies they use change in the last two years, making some people's jobs vulnerable to automation. 47% have seen changes in working methods or practices. Some sectors are changing faster than others: 57% of adult employees in ICT have seen changes in their jobs during the past two years compared by 27% of those in accommodation and catering (Figure 1).

Before reaching conclusions about the future, it is important to understand the different ways technology is changing the world of work: job substitution, job creation and job transformation.

1) Conducted in 2014, the ESJS collected information on 851 workers in 26 EU Member States who were asked to provide information on their work and skills requirements.

3 A BALANCE BETWEEN NATIONAL EDUCATION AND TRAINING LABOUR MARKET

Figure 1. Adult employees seen increasingly changed or vulnerable to their tasks in various EU MS

Source: Cedefop European skills and jobs survey.

BRIEFING NOTE | JULY 2017 | 1008 1003 1001

Insights into skill shortages and skill mismatch

Learning from Cedefop's European skills and jobs survey

EVIDENCE FROM CEDEFOP'S EUROPEAN SKILLS AND JOBS SURVEY

Skills, qualifications and jobs in the EU: the making of a perfect match?

Matching skills and jobs in Europe
Insights from Cedefop's European skills and jobs survey