

Skills and Wellbeing in the Age of Automation

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Road map

1. Technology and jobs
2. Skills for the future
3. Workers' attitudes to technology adoption and wellbeing at work

1. Technology and jobs

Jobs lost?

- Economists pay too much attention to how many jobs these discoveries would eliminate
- This is only one side of the story, and not the main one
- The main impact is **transition**
- The main transition is to new roles and new tasks within companies, or within your sector, with only some changes taking place to entirely new type of jobs

Unbalanced growth

- The reason for the transitions is that technological progress does not affect all jobs equally. It is “unbalanced”
- The usual process is new technology in a sector raises productivity, pushing sector output up for given employment
- Relative prices in that sector fall – if price elasticity is low (as in large sectors, like the whole of manufacturing) for given employment the sector produces “too much”
- Workers leave the sector and move to sectors with lower productivity growth to rebalance output, given demand spillovers (Ngai and Pissarides, 2007)

The challenge

- The challenge posed by new technologies is not how to save jobs or create more jobs
- It is how to manage the transition of workers to new technologies – **what skills do they require?**
- And how to ensure that technology is used to **improve worker wellbeing**, and not only for private gain

Is it different this time?

- Despite claims that “this time it is different” there is no evidence – so far – that the response of jobs to digital technologies is different
- Beginning with Frey and Osborne (2013), the claims are based on what machines “can do,” not on what they are employed to do
- And currently, in most industrial countries, there is worker shortage, not job shortage

Automation technologies I: Robots

- By far most use of robots is in manufacturing
- Even within manufacturing, they are mainly used in electronics and transport equipment, with “handling” their main activity.

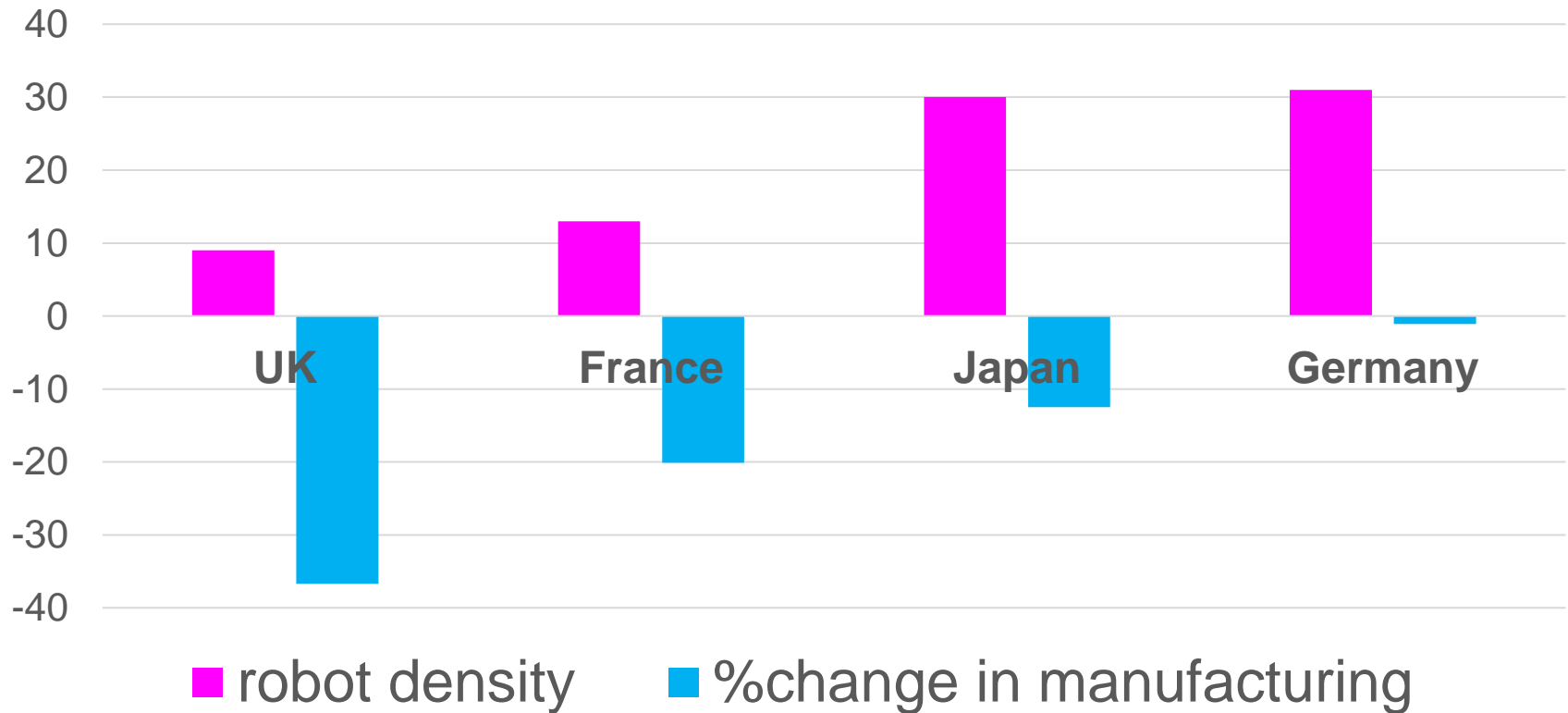
Countries

- South Korea, Japan, Germany are the main industrial countries using them.
- But China is now installing more robots than the rest of the world put together so it will soon overtake them.

Manufacturing productivity growth

- Dynamics of manufacturing employment worldwide is mostly like a typical response to technological growth in manufacturing that exceeds other sectors' growth causing structural change
- But is the productivity growth due to robotic automation? Difficult to link them, although robots increase productivity (Graetz and Michaels, 2018)
- Openness matters too when examining manufacturing employment (Matsuyama, 2008).

Robots/1000 employees and %change in manufacturing employment, early 2000s-2017



Existing empirical studies

- Empirical studies using spatial data (Acemoglu and Restrepo, 2020, Chiacchio, Petropoulos Pichler 2018), find negative effects in local labour markets in both US and EU.
- But industry studies don't find them (Graetz and Michaels, 2018)

Influence of institutional structure

- Kapetaniou-Pissarides (2023) on industries across Europe and US find that results depend on:
 - Innovation capabilities of each country (WEF 7 indicators)
 - Openness
- Countries with better innovation capabilities (Scandinavians, US, Germany) are more likely to take on more robots and increase productivity and competitiveness
- Through trade, they complement employment to robots and expand employment (relative to underlying trend)

Automation technologies II: AI

- It is much more difficult to collect data for the use of AI in production
- When questioned, most firms, especially large ones, say that they are using some kind of AI
- But the general view is that this use is still very limited.
- AI is based on software that solve problems, so it cannot be counted in the way that self-standing robots can.

What do we know about AI's impact?

- AI affects a bigger range of jobs than computers or robots
- E.g., big language programmes like ChatGPT can replace workers at all skills except the very top ones (Stanford AI report, 2022)
- Paralegals, civil servants, programmers could go when AI is developed further

Job features of new job creation

- The features of the jobs of the future will be predominantly of two types.
 - The ones that complement the machines – developing them, adapting them to the company’s environment etc.
 - Person-to-person service provision – service jobs in “luxury” sectors, e.g., health and care, hospitality, creative industries
- William Baumol predicted it in 1967 – better foresight than Keynes and Leontief!

2. Skills for the future

What skills will be in demand?

- Given what we said about new jobs, skills will be of two kinds
- New technology skills and “soft” skills
- But in what proportions and how are they changing?

Some new research

- At CEP/IFOW we got all online job ads from Britain, about 2.5 million and cleaned the data down to about 1.5 million per year
- Firms advertise jobs with about 3,700 separate skills (on the Lightcast – formerly Burning Glass – definitions)
- What do we find about the skills required now for recruitment?

“Old fashioned” skills still dominate

- Divide skills into three categories
 - Core skills; ones requested in more than 20% of job ads within an occupation
 - Emerging (new) skills; those that were requested by 3X as many jobs in 2022 than in 2016
 - Disappearing (old) skills; those getting less than ½ mentions in 2022 than in 2016

Most popular skills

2016	2022
Communications	Communications
Management	Management
Client services	Client services
Sales	Assertiveness
Customer Service	Customer Service
Assertiveness	Solutions Focused
Solutions Focused	Data Analysis
Engineering Analysis	Sales
Data Analysis	Engineering Analysis
Retail Sales	Food Services

Comments

- Although the top three are unchanging, and much more dominant than the ones below, new skills related to digital technologies are emerging
- Sales dropping and food services (deliveries) rising
- But it is still the case that most skills required are ones that involve person-to-person services

Thematic categories

- The “themes” are related to the fact that Britain is a service economy specialising in business, management, etc.
- Most popular theme is “Business” – 80% of job adverts require some knowledge of business operations
- Followed by:
 - Social skills, leadership and critical thinking 65%
 - Media and communications 60%
 - Customer and client support 50%
 - Sales 40%
 - IT 40%

Changes in requirements

- Biggest changes, both of new skills emerging and old ones disappearing, are in IT
- Followed by
 - Health services
 - Engineering
 - Environment
 - Compliance

Most frequent new and old skills

Old Skills (2016)		New skills (2022)	
Skill	Category	Skill	Category
Microsoft servers	IT	Amazon web serv.	IT
Nursing care	Health care	Client onboarding	IT
Telemarketing	Sales	DevOps	IT
Scripting lang.	IT	CI/CD	IT
Web navigation	Other	Cyber security	IT
Apple IOS	IT	AI	IT
HTML5	IT	Talent acquisition	HR
Microsoft windows	IT	Logical reasoning	Soc, Lead, crit
Digital media	Media and comms	Typescript	IT
Residential dev.	Real estate	Machine learning	IT

Comments

- The growth of IT is evident – most new skill requirements are in that sector
- They are replacing older skills that are now general knowledge, like web navigation or Microsoft Windows expertise
- Should one train in STEM? Yes, up to some basic knowledge – but don't be misled that that's where the future of human work is!
- Many STEM related tasks can be done by AI

Non-technical service sectors

- The challenge for these jobs is how to make them attractive for large number of workers, especially new entrants to the labour market
- Problem aggravated by the large role of the public sector in these employment sectors
- And by the low productivity growth in these labour-intensive sectors.

3. Workers' attitudes to technology adoption and wellbeing at work

Uncertainties about the future

- It is clear from previous analysis that there are a lot of uncertainties about the future of work.
- How do workers feel about it and how are employers or governments responding?

Workers' attitude to having a job

- Surveys of workers' attitudes to work have proliferated recently, as part of life “happiness” surveys.
- Losing your job is one of the life events that gives most unhappiness (along with illness/death in the family and divorce).

Being at work

- But being at work is one of the activities that gives most stress and dissatisfaction, especially some things associated with work, like commuting or seeing your boss.
- Only being sick in bed scores consistently below being at work (Bryson and MacKerron, 2017, De Neve-Layard book, 2023)

Isn't that what the economist should expect?

- There is a work/leisure trade off! Does income compensate at the margin?
- To some extent, but when workers are asked about what would make them feel better at work, they mention
 - better communication with managers
 - more transparency
 - better social relations
 - more time flexibility etc.

before they mention more money.

Room for improvement

- And there are variations across workers. E.g., professional people feel better at work than non-professionals.
- Clearly, worker wellbeing could be improved without violating the work/leisure trade off

New technologies and wellbeing

- Studies of connections between risk of automation, measured, e.g., as in Frey-Osborne, and subjective wellbeing find negative correlations (Clarke and Rohenkohl, IFOW, 2023).
- CEDEFOP Dec 2022 survey of worker attitudes finds many more worry about losing their jobs to new technology than possible with known technologies.
- There is also evidence that companies that care about workers' subjective feelings at work and take measures, including training, find it easier and quicker to adopt the new technologies (MGI, 2023).

Good work

- These fears would be eliminated if employers provided “good work”
- The feature of good work that usually comes on top of workers’ lists is communication and social interaction at the workplace.
- Next is hours of work and flexibility in the choice of hours by the worker

Good work: communication

- By this it is usually meant the ability of the worker to communicate freely with line managers and managed employees, and have control over their role.
- Worker has an influence over the tasks that they select. Matching skills with job attributes.
- The worker is the best judge of what they can do best, and enjoy doing, so by giving them freedom to select, both the company and the worker benefit.

Hours of work in good jobs

- Several empirical studies of wellbeing at work, (e.g., summarised by De Neve and Layard, 2023, chapter 12, IFOW *Good Work Monitor*), concluded that having choice over hours is positively associated with worker wellbeing.
- This feature of good work has become more important since the pandemic. The new technologies (zoom, teams, meets etc.) certainly help, but also, once home working was forced on companies, most discovered that flexible working time might even improve productivity, not only worker wellbeing.

Workers' views about future job

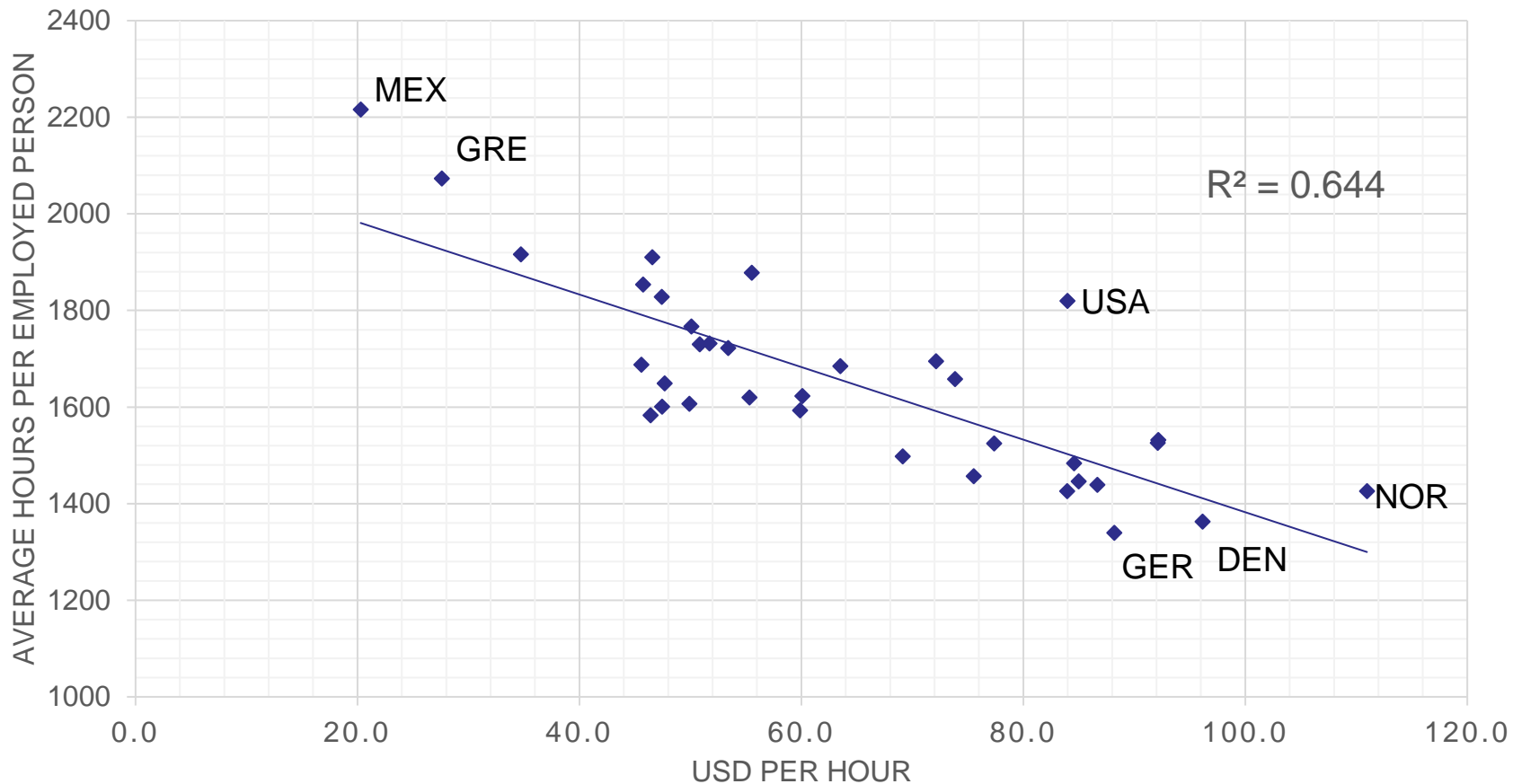
How employers respond to mental health is important consideration when applying for jobs	81%
<i>Workers want to see more:</i>	
Flexible working hours	41%
Workplace culture that respects time off	34%
Ability to work remotely	33%
Four-day week	31%

Source: American Psychological Association annual workers' survey 2022

How to spend leisure

- A matter of choice. Some might want to use it for better work-life balance during the normal working year, others might prefer part-time work, and yet others might prefer longer annual leave.
- Given the advantages of bunching hours of leisure, as in a two-day weekend, eventually the four-day week might become the norm.
- Several recent experiments have been well received (<https://www.cnbc.com/2023/02/24/worlds-biggest-4-day-workweek-experiment-shows-big-health-benefits.html>).
- Typical response: “improves health, finances and relationships: It ‘simply makes you happy’” (Tyler Grange)
- This is a voluntary reduction in hours, not forced by technology taking over jobs (see also Pedro Gomes, 2021)

Correlation between hours of work and hourly labour productivity, 35 countries, 2021 (source: OECD)



Conclusions

- Automation technologies are being implemented to working environments – but not always with good results
- New skills are required, although the old skills that help person-to-person service provision still dominate
- IT the sector undergoing most change
- Improving communication at work and time flexibility can improve both worker wellbeing and skill acquisition/productivity