

Work, Skill, and 'the human' at the centre of industry 5.0

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Up·Skill

Up-Skilling for
Industry 5.0 Roll-Out



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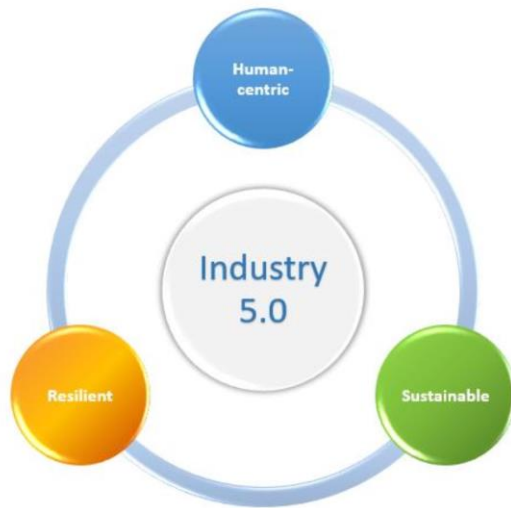
UpSkill Overview

- 3 Universities
 - Anglia Ruskin University, Cambridge, UK
 - Mälardalen University, Eskilstuna, Sweden
 - Milan University, Italy
- One Innovation Network – TWI Innovation Network
- 9 Case organizations
 - A German SME deep in the heart of the Mittlestand
 - A Large Automotive Manufacturing Company in the UK
 - Swedish Industrial Manufacturing
 - Swedish Consumer Manufacturing
 - 5 Italian 'craft' manufacturers – tailoring, furniture, instruments, luxury goods
 - 1 UK instrument company



What is Industry 5.0?

- ‘Upgrade’ on Industry 4.0
- Three pillars:



“The Industry 4.0 paradigm, as currently conceived, is not fit for purpose in a context of climate crisis and planetary emergency, nor does it address deep social tensions. On the contrary, it is structurally aligned with the optimization of business models and economic thinking that are the root causes of the threats we now face. The current digital economy is a winner-takes-all model that creates technological monopoly and giant wealth inequality.” (EU, 2022: 5)*

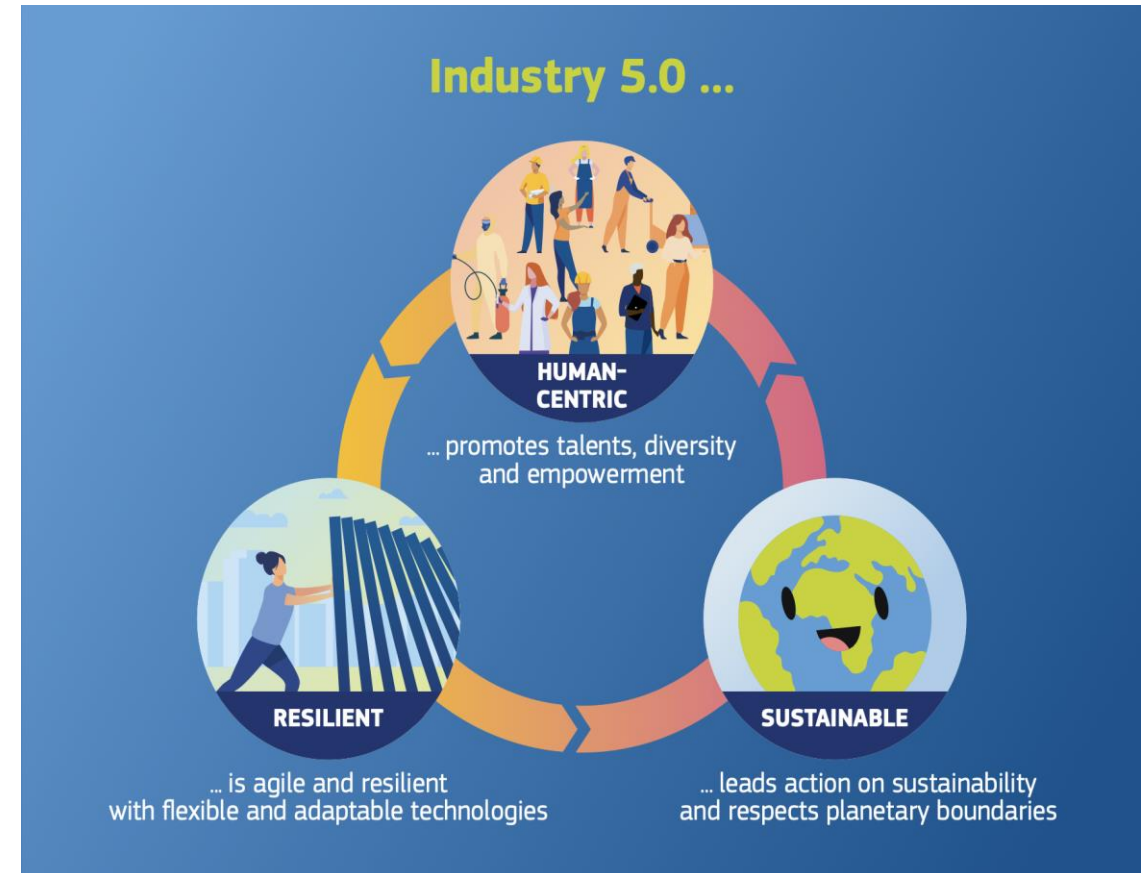
* European Commission, Directorate-General for Research and Innovation, Renda, A., Schwaag Serger, S., Tataj, D. et al., Industry 5.0, a transformative vision for Europe – Governing systemic transformations towards a sustainable industry, Publications Office of the European Union, 2021, <https://data.europa.eu/doi/10.2777/17322>

Reality and Promise?

- Digital Taylorism & Deskillling

“14 solutions tend to focus on technological progress and efficiency gains, with little to no upskilling for workers... and often negative wellbeing outcomes” (Briken et al, 2023: 1)

- Technological determinism
- AI and knowledge management
 - Old wine in new bottles?



What is 'the human' in Industry 5.0?

- “the human is addressed as a generalised human being, reduced to a variable for understanding human intentions which may add value to the technology that is to be integrated” (Briken *et al.*, 2023: 13)
- Engineering paradigm
 - systems integration & modelling
 - Worker as 😊 smiley emoji
- Human as collaborator (with co-bot)
- Human as vulnerability
 - Physically – to be protected (health and safety)
 - As risk to machinery – source of error/malevolence
- Human as worker

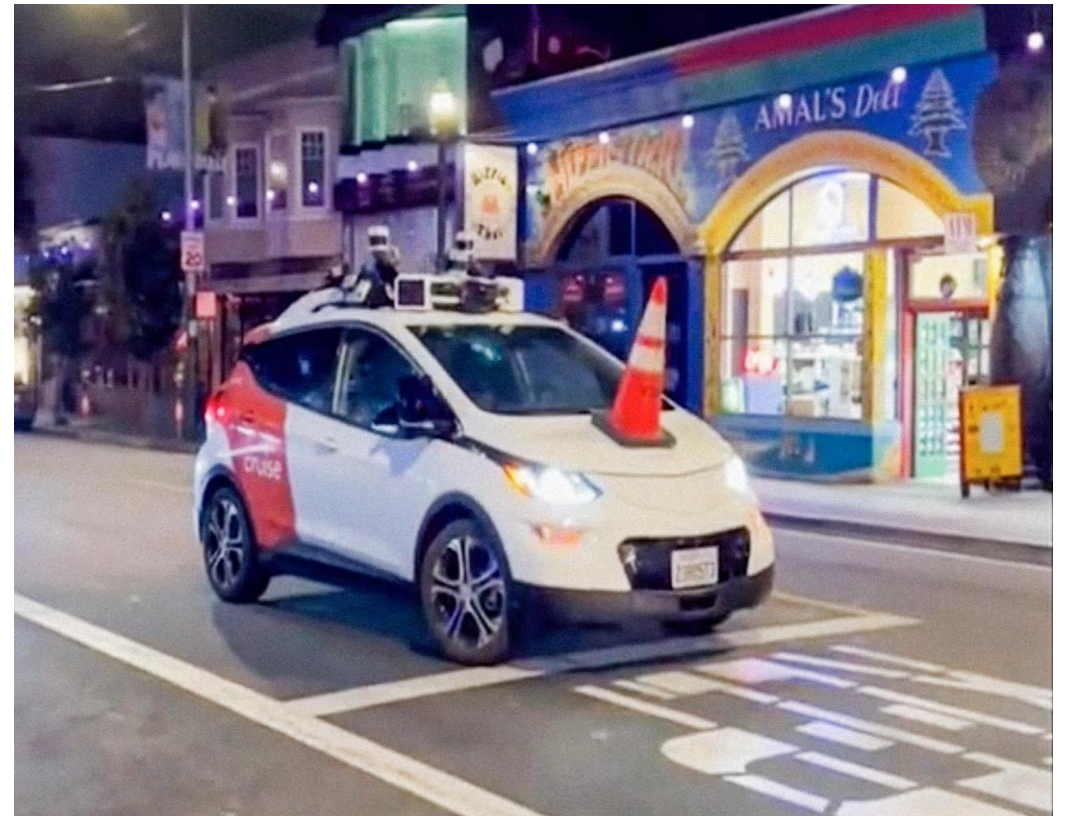
Human as Vulnerability in the System

- “only a Dave Bautista or Arnold Schwarzenegger”
 - 9kg parts, 8/tray in deep stillages
 - lifting repeatedly, every 48 seconds, for an eight hour shift
- 80 point health/safety check
 - Including EDI
- Human as ‘vulnerability’
 - Dangerous work
 - Undesirable work
- Human as ‘value adding’
 - ML too costly/impractical



Human as Risk to the System

- 'People don't like change'
- A tale of two AGVs
 - Integration
 - Sequestration
- Workers as danger
 - To be managed



Enlightened Engineering Management?

- A Tail of Two Cobots?
- Workers' humanity as irrationality
 - Risk to system
 - To be managed
 - 'misunderstanding'
- Robot humanization
 - Marvin/Roxy
 - Cylon/Terminator
- Socialisation vs consultation



“The human worker tends to be evaluated as fallible, vulnerable, and irrational, therefore models developed to simulate intentions aim to streamline such irrationality. The technology is framed as the tirelessly working robot that needs feeding with data about the environment to run its programmed tasks to full capacity.”

(Briken et al., 2023: 15)

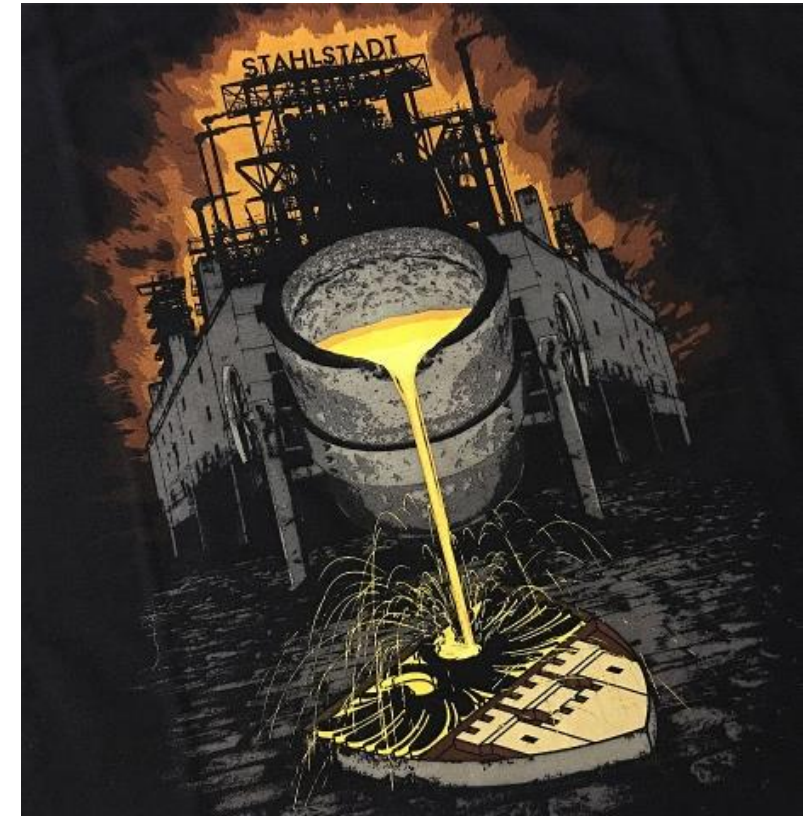
A Systems Perspective on Skills

- Human capital discourse
 - Education and training
 - Formal qualification
- Certification
 - Training bodies
 - Universities/colleges
- Managers
 - A narrower set of skills – soft or hard
 - Top-down, functional, task-focussed – clash with ‘whole person logic’



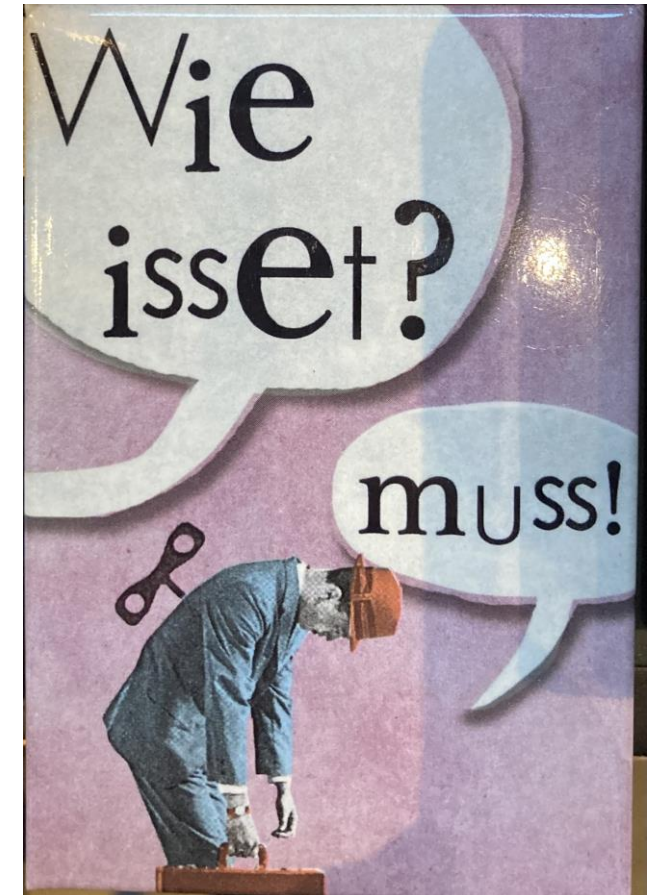
The View from the Shop-floor

- Peer-to-peer recognition of skill
 - Formal and informal
 - Anchored in *doing* the job
- Embedded in a broader context
 - Worker identity
 - Cultural value system



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- Example – gendered/generational technologies
 - Spanners vs x-Box
 - Material vs digital

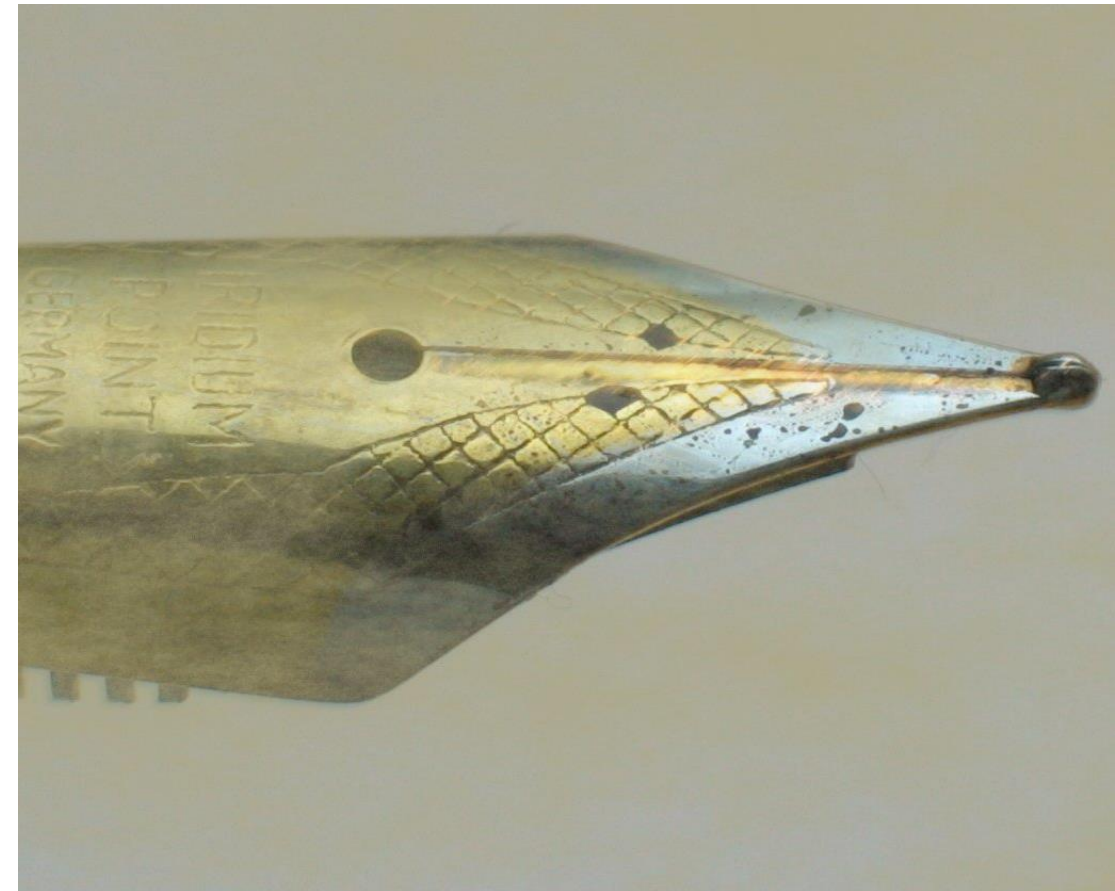


The Human: Two Social Science Perspectives

- Human Agency
 - Autonomy, discretion, skills utilisation, employee engagement and involvement
- Work Design
 - Job demand
 - Job satisfaction
 - Job quality
- Voice
- ‘Anthrovision’ (Tett, 2021)
- Meaning
- Practice
- Embeddedness
- Human > Worker

A Focus on Workers

- Dominant framework in policy and consulting
 - Robots will take our jobs
- Where are the skills?
 - Machine specific skills
 - Replace the machine and the skill leaves too
 - Material skills and multi-sensory engagement
 - The sound of a hard metal
 - The feel of a gasket clicking into place
 - Touch, sound, smell
 - Customer engagement
 - Innovation and service
 - Maintenance
 - 3D printing example



Managerial Skills

- Industry 5.0 is a strategic proposition
- Misrecognition of skills on shop-floor
 - 2 weeks or three years to learn?
- Anxiety of professional managers
 - Desire for control at a distance
- Lack of technical know-how
 - Risk of too much technical knowledge
- Lack of understanding of employee motivation
 - Fantasy of 'millennials' and digital natives – the 'tablet' story
- HRM skills
 - Recruitment, development and recognition



Moving beyond an efficiency/tech mindset



Practical and Policy Challenges

- Managerial skills are essential
 - Reality check on tech
 - Cybersecurity
- Policy is ill suited to SME context
 - Cost of tech
- Flexibility and old machinery
 - ‘the bloke in the shed’
 - Close to the customer
- Skills are culturally situated
 - Recognition by colleagues and customers
 - Work itself is a cultural value



‘We are witness today to an investment in the conception of the human being as above all, and in all sense, a *working* being. If there exists in us a resistance to perpetual activity, it is denied across politics, commerce and culture. Working... is now the imperative of our time, as evidenced by policies on welfare, education, retirement and disability by liberal democratic governments across the world.’

Josh Cohen (2018) *Not Working: Why We Have to Stop*. London: Granta. p. 65

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