

CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYDD

Our Changing Environment and the Prospects for Decent and Sustainable Work

Dr. Dean Stroud

School of Social Sciences, Cardiff University

Debating the Future of Work: Challenges and Prospects

Hilton Hotel Sheffield, 28-29 May 2019

Discussion Focus

- Digital Technology Solutions (in heavy industry) to a Changing Environment
 - What prospects decent and sustainable work?
 - The ILO: The future of work in a changing natural environment
 - Heavy Industry and the Environment
 - Industry 4.0: Digital Technology and Work
 - The Prospects for Decent and Sustainable Work

The ILO: The future of work in a changing natural environment

Table 3. Sectors most affected by the transition to a circular economy

Industries set to experience the highest job demand growth (absolute)		Industries set to experience the strongest job demand decline (absolute)	
<i>Sector</i>	<i>Jobs (millions)</i>	<i>Sector</i>	<i>Jobs (millions)</i>
Reprocessing of secondary steel into new steel	30.8	Manufacture of basic iron and steel and of ferro-alloys and first products thereof	-28.2

- “Environmental sustainability will disrupt the world of work”, but... “Sustainability... is not a job killer”
- Sustainability = structural economic transformation, but more and better jobs... Environmental sustainability can be compatible with decent work
- Job destruction (e.g. coal) but job creation (e.g. renewable energy) = decarbonisation = 18m jobs created and 6m jobs lost – but unevenly distributed by region and sector (see Stroud et al. 2014; 2018)
- Resource intensive sectors (mining and manufacturing) = circular economy (see Table 3)
- The importance of human capital and social dialogue – skills transformation and building consensus for long-term environmental sustainability

(Montt, Frage and Harsdorff, 2018)

Heavy Industry and the Environment

The Environment and the Steel Industry

- The production of steel accounts for approximately 5% of total CO2 emissions. It is the largest industrial emitter and a prime focus for governments.
- Improvements in energy efficiency have led to reductions of about 50% in energy required to produce a tonne of crude steel since 1975 in most of the top steel producing countries.
- Further improvements in energy efficiency, by making the greatest possible use of state-of-the-art technologies (di Carvalho, 2010).

- *A Sustainable Europe 2030* e.g. 32.5 per-cent improvement in energy efficiency by 2030 (i.e. GHGs emissions; but also a focus on environmental degradation from resource extraction [e.g. materials, water] – and transportation) and pollution
 - Environmental Regulations: compliance and innovation – a beneficial constraint (Porter and Van der Linde, 1995)
 - **Greening Operations and Operatives** i.e. greening processes and greening jobs and skills (e.g. to reduce energy consumption; raise awareness of environmental issues) (Evans and Stroud, 2016)



Industry 4.0: Digital Technology and Work

- ‘Technological innovation must be one of the solutions to climate change’ (Räthzel and Uzzell, 2013: 251)
- *Digital Technology*: From epochs of steam, electrification, computers and automation to ‘cyber-physical systems’ of manufacturing production configured upon digital networking systems and the centrality of ‘big data’ for ‘smart factories’ (Briken et al, 2017) = A New Lexicon: Fourth Industrial Revolution; Advanced Manufacturing; Smart Factories, *Industry 4.0*, etc.
 - Digitisation and virtualisation;
 - Clouds and Big Data
 - Wearable Technologies;
 - Micro- and Macro-Tasks;
 - AI and robotics displacing workers (see Lloyd and Payne, forthcoming)
- Pfeiffer (2017) and “*digital despotism*”
 - *Industry 4.0*: a political discourse and ‘campaign to change the way we work’
 - Obtain worker consent and acceptance to technological change that follows ‘an ideological script written by powerful economic actors’
 - Role of technology as instrument of control or collective solidarity

WaterWatt, DroMoSplan & ESSA



- WaterWatt: Gamification Digital Application Technologies and Energy Efficiency
 - H2020 Project: Improving energy efficiency in foundation industries (metals, cement, ceramics, chemicals, paper)
- DroMoSplan: Drone Technology and Efficiency and Productivity
 - RFCS Project: Improving efficiency (and identifying pollution) in the steel industry
- European Steel Skills Agenda (ESSA): Industry skill needs emerging from digitalisation and sector restructuring
 - Erasmus+ Project: Skill needs broadly, but a core focus on digitalisation, efficiency and environmental concerns driving new skill needs

In the context of 'greening' operations and workers' skills:

1. What are the terms upon which new digital technologies are accepted by management and workers?
2. What are the 'powers' and 'interests' at play on the insertion (within organisations) of new technologies?
3. What will be the new patterns of skills development and recruitment emerging from technological change?

Digital Technology and Work

- Orlikowski (1992) and Edwards and Ramirez (2016) – the ‘effect’ of technology (soft determinism)
 - *intended effect and unintended effect; direct and indirect effects; reconstitution in use; the immanence of the effect; the degree of success; discontinuity*
- Hall and Soskice (2001) – Varieties of Capitalism
 - Co-ordinated and Liberal Market Economies and Patterns of ‘Green’ Skills Development, Innovation and Workplace Relations

The Prospects for Decent and Sustainable Work

Table 1. Examples of upskilling to new occupations

	Occupation(s)	Core training	Upskilling	New occupation
DK	Industry electrician/energy technologist	VET qualifications/tertiary engineering qualifications	Knowledge of energy sources, ability to integrate energy systems, project management	Manager in renewable energy

CEDFOP (2010) *Skills for green jobs: European synthesis report* Luxembourg: Publications Office of the European Union

- Green jobs characterised by higher levels of non-routine cognitive skills – have a higher dependence on formal education (Consoli et al 2015) – implications for displaced low skilled/poorly qualified workers (unless upskilled);
- Country differences in opportunities for decent (high skilled, high waged) work as workers (e.g. by technology; restructuring) become displaced (e.g. Stroud et al. 2018; Evans and Stroud, 2016);
- Intra-sector (e.g. steel) country differences: a) engagement with digital technology; b) compliance and innovation in the greening of skills
- Technologies and new forms of work organisation and re-distribution of tasks (e.g. monitoring teams and data analysis): Drones = outsourcing + enhanced/diminished work and autonomy
- *Discontinuity* (Edwards and Ramirez, 2016): greater surveillance (regulation and control) – ‘dataveillance’ (Lupton 2016) and ‘function creep’ from digital technologies aimed at efficiency (drones; gamification applications) – country differences in levels of resistance, trust and dialogue:
 - Data on ‘green’ issues e.g. efficiency; pollution levels – difficult to contest, but performance data may be used for other purposes and the initial consent may never have been given (*direct and indirect effects*)

References & Project Information

ESSA: Erasmus+ Programme Key Action 2 – Cooperation for Innovation and the exchange of good practices; Agreement number: 2018-3059/001-001: Project Number: 600886-EEP-1-2018-1-DE-EPPKA2-SSA-B <https://www.estep.eu/essa/>

DroMoSplan: This project has received funding from the European Union's RFCS grant agreement No. 710066 <http://www.dromosplan.eu/>

WaterWatt: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 695820 <https://www.waterwatt.eu/>

Briken, K., S. Chillas, M. Krzywdzinski, and A. Marks (Eds.) (2017) *The New Digital Workplace: How New Technologies Revolutionise Work*. London: Palgrave

Consoli, D., Marin, G., Marzucchi, A. and Vona, F. (2015) *Do green jobs differ from non-green jobs in terms of skills and human capital: SEEDs Working Paper Series 10/15*, Sustainability Environmental Economics and Dynamic Studies

Di Carvalho, A. (2010) *Challenges & opportunities for the steel industry in moving towards green growth* OECD Green Growth Workshop Seoul, 4 March 2010

Edwards, P. and Ramirez, P. (2016) When workers should embrace or resist new technology? *New Technology, Work and Employment* 31(2) 99-113

Evans, C. and Stroud, D. (2016) Greening steel work: varieties of capitalism and the 'greening' of skills *Journal of Education and Work* 29(3), pp. 263-283

Hall, P. and D. Soskice (2001) 'An Introduction to Varieties of Capitalism' in P. Hall and D. Soskice (eds.) *Varieties of Capitalism: Institutional Foundations of Comparative Advantage*, 1-68, Oxford: Oxford University Press

Pfieffer, S. (2017) Industry 4.0 In The Making - Discourse Patterns and Digital Despotism On The Rise, in Briken, K., Chillas, S., Krzywdzinski, M. and Marks, A. (Eds.) (2017) *The New Digital Workplace: How New Technologies Revolutionise Work*, 21-41, London: Palgrave

Porter, M. and C. van der Linde (1995) 'Towards a New Conception of the Environment-Competitiveness Relationship.' *Journal of Economic Perspectives*, 9, 4, 97-118.

Lupton, D. (2016) 'The diverse domains of quantified selves: self-tracking modes and dataveillance.' *Economy and Society*, 45, 1, 101-122.

Montt, G., Fraga, F. and Harsdorff, M. (2018) *The future of work in a changing natural environment: Climate change, degradation and sustainability*, International Labour Office – Geneva: ILO, 2018

Orlikowski, W.J. (1992), 'The Duality of Technology: Rethinking the Concept of Technology in Organizations', *Organization Science* 3, 398–427.

Uzzell, D. & Rätzhel, N. and (Eds.) (2013) Local place and global space: solidarity across border and the question of the environment, in Nora Rätzhel and David Uzzell (2013) *Trade Unions in the Green Economy: Working for the Environment* Abingdon: Earthscan-Routledge

Stroud, D. et al. (2018) Governments matter for capitalist economies: regeneration and transition to green and decent jobs *Economic and Industrial Democracy* 39(1), pp. 87-108

Stroud, D. et al. (2014) Skill development in the transition to a 'green economy': A 'varieties of capitalism' analysis *The Economic and Labour Relations Review* 25(1), pp. 10-27