



Europe fit, **safe and healthy** for the digital age

Digitalisation and new and emerging risks to occupational safety and health (OSH)

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7^a giornata dell'ingegneria della sicurezza

Matera, 25th October 2019



Digitalisation – what are we talking about?

- *Digitisation:*

Conversion of an analogue signal conveying information to binary bits (digital data) – that can be understood by computer and electronic systems (digital technologies)

- *Digitalisation:*

Application of digital technologies by an organisation, industry or country



The 4th industrial revolution

A driver of change

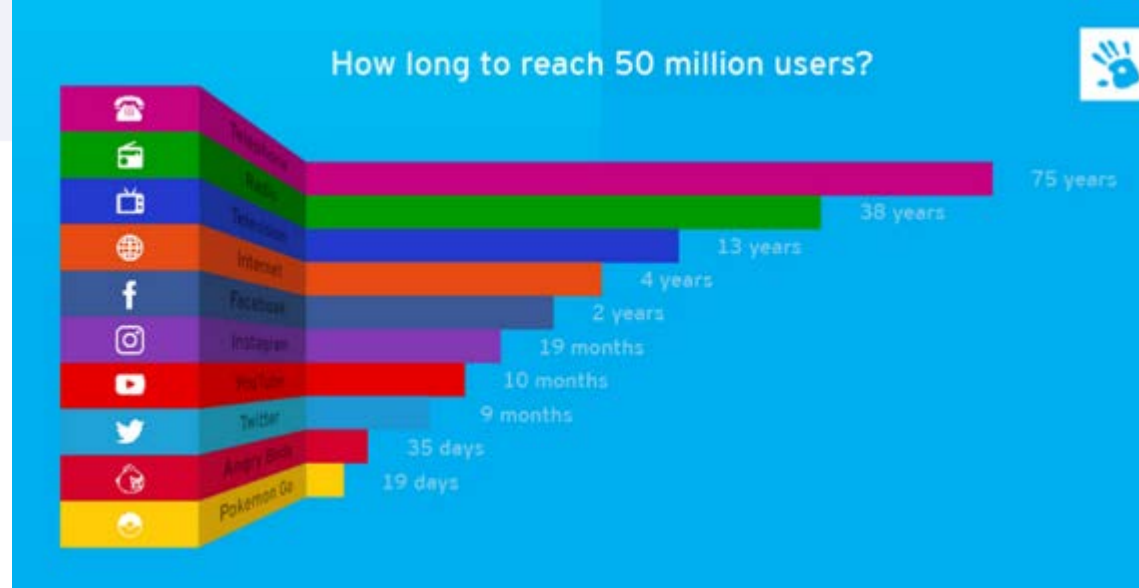
■ Digitalisation influences

- Jobs
- Sectors and industries
- Tasks
- Employment forms
- Perceptions of work

■ New occupations and industries

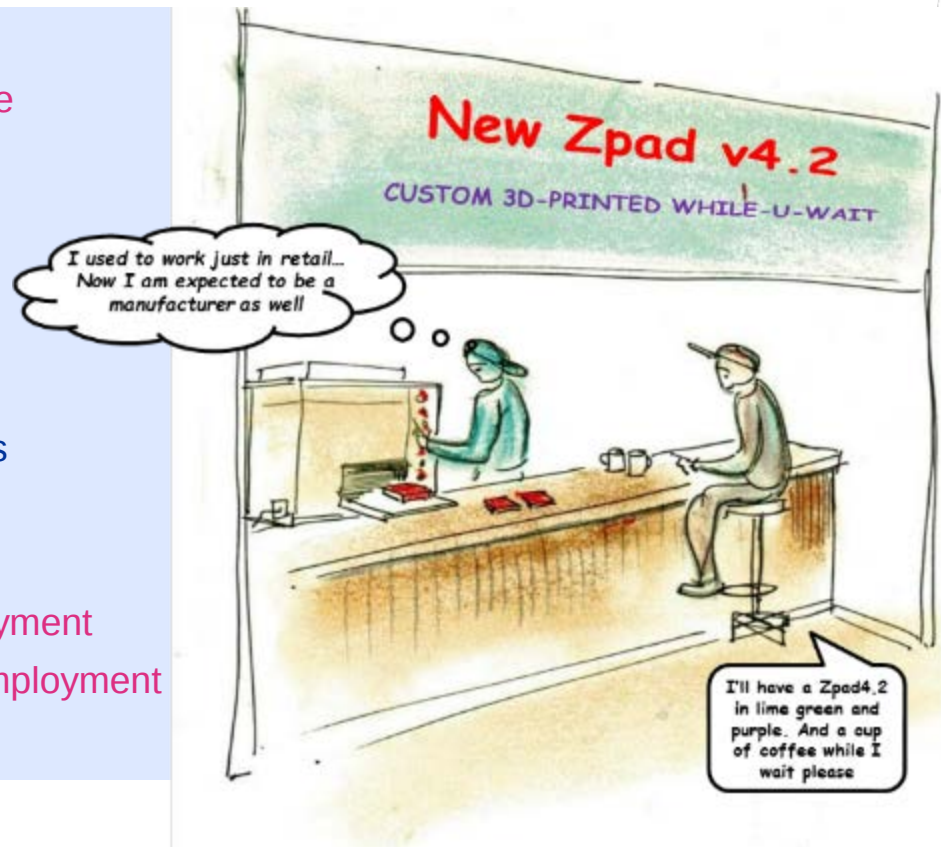
- eBay, Facebook, YouTube barely existed 10 years ago, now global corporations
- Since the invention of the PC, over 1,500 new job titles in occupational classifications (e.g. Database Administrator, Web Designer, Cyber-security)
- 65% of children entering primary school will end up working in new jobs that don't yet exist

(Research from the World Economic Forum)



What is shaping the future? Key trends and drivers of change

- Ageing population and workforce
- Increasing migration into and within Europe
- Climate change
- Economic environment
- Greater globalisation
- The European Digital Single Market
- Alternative supply chains and distribution
- Micro and small enterprises, entrepreneurs
- Data-enabled economy
- Growing employment in the service sector
- New business models and forms of employment
- More part-time, fixed-term or temporary employment



Digital technologies and impact on work

- **Advanced, collaborative robotics**
- Artificial Intelligence
- Communications networks and mobile devices
- Wearables, miniaturisation and bionics
- Virtual and Augmented Reality
- Autonomous vehicles and drones
- Big Data



- **Robots becoming “uncaged”**
- Smart and autonomous systems
- Variety of tasks digitalised and automated
- **In ALL sectors**



Advanced smart robotics and automation

32% of jobs are likely to change radically as individual tasks are automated (OECD)

Opportunities:

- Takes over hazardous tasks
 - maintenance, logistics etc.
- Improves quality of work
 - automating monotonous/repetitive tasks
- Access to work for a diverse workforce



Safety challenges

- **Proximity of robots to workers**
 - Collisions with the robots
 - Risks from the equipment used by the robots
- **Unforeseen situations**
 - Unforeseen situations at the design stage
 - Incidents outside normal operations e.g. maintenance
- **Workers' acceptance and sabotage**
- **Technological complexity and “black box”**
- **Over-reliance on the technology**
- **Cyber-security and functional safety**

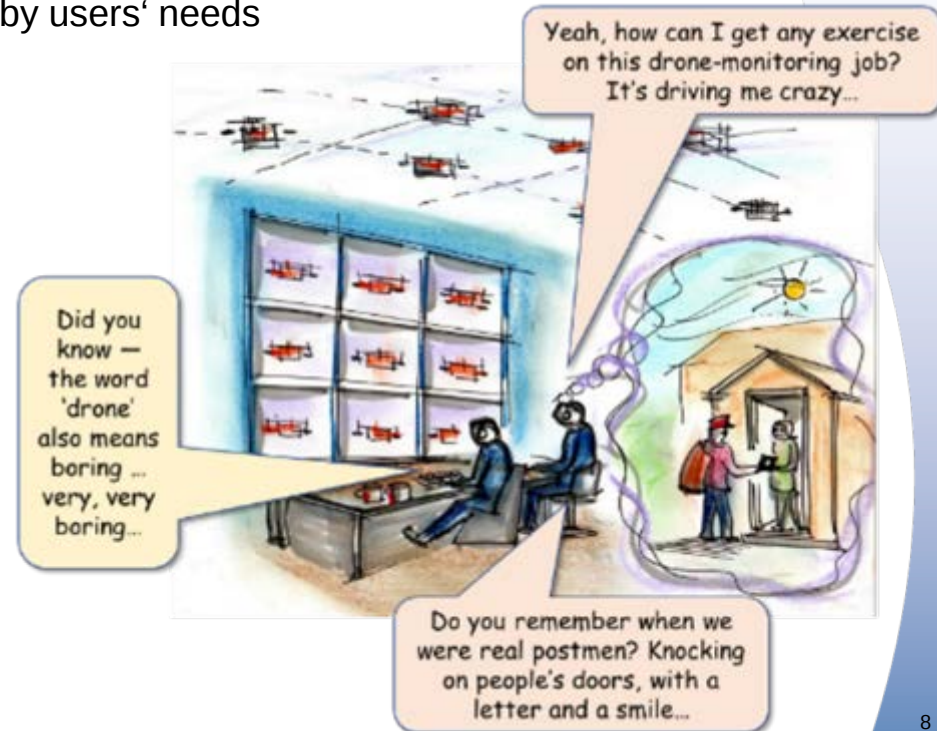


Human brains are not so easy to hack..



Ergonomics and human factors

- **“Sitting is the new smoking”**
- **Human-Machine Interfaces**
 - Driven by technical feasibility and market, not by users' needs
 - Lack of harmonisation of design of the HMI
 - Gesture, voice, eye tracking control
- **Overload ...**
 - Increasing technological complexity
 - Work / risk intensification
- **vs Underload**
 - Monotonous work, narrowed job content
 - De-skilling of work
- **Polarisation / “hollowing out”**



Organisational and psychosocial challenges

- **Flexibility versus 24/7 availability**
 - Blurring of boundaries work/private life
- **When your peers are robots**
 - Virtualisation of relationships, loss of social support
 - Loss of motivation and poorer job satisfaction
- **Pressure to perform – at the same level as machines?**
- **Ethics and the human-machine team**
 - Who does what, the machine/robot or the worker?
 - Can/will a worker take instructions from a robot-boss?
 - Fairness? Discrimination?



MEPs vote on robots' legal status - and if a kill switch is required

By Jane Watfield
Technology reporter

12 January 2017 Technology

Share



Monitoring of workers (is as old as work itself...)

▪ Opportunities

- To improve workers' safety and health through real-time data on OSH exposures, risk predictions etc.

▪ BUT people analytics, increased micro-management, gamification, etc.

▪ Mixed views on the benefits

- 25% feel it has more benefits than downsides, 38% disagree, 35% are uncertain (TUC report)

▪ Privacy invasion – real or perceived

- What data are collected, used, for which purpose, who has access?
- GDPR – but many workers not aware of their rights or feel unable to challenge employers' use of surveillance: Real right to opt out?

▪ Unbalance of information

▪ Pressure to perform

- Lack of control of pace and content
- “Optimisation” of working time, not taking breaks
- Loss of social interactions
- Increased risk-taking attitude





"We have long had major concerns about labour standards in the broader parcels sector... All too often we are competing with players in the delivery industry who are able to avoid NI charges and the UK's minimum employment standards through labour models that are unfair and insecure."

Moya Greene, the Chief Executive of Royal Mail Group



Job insecurity

- Most are actively **seeking more regular** types of work
- 92% rate **job security as 'very important'** or 'important' in a job (*British Social Attitudes Survey No.33*)

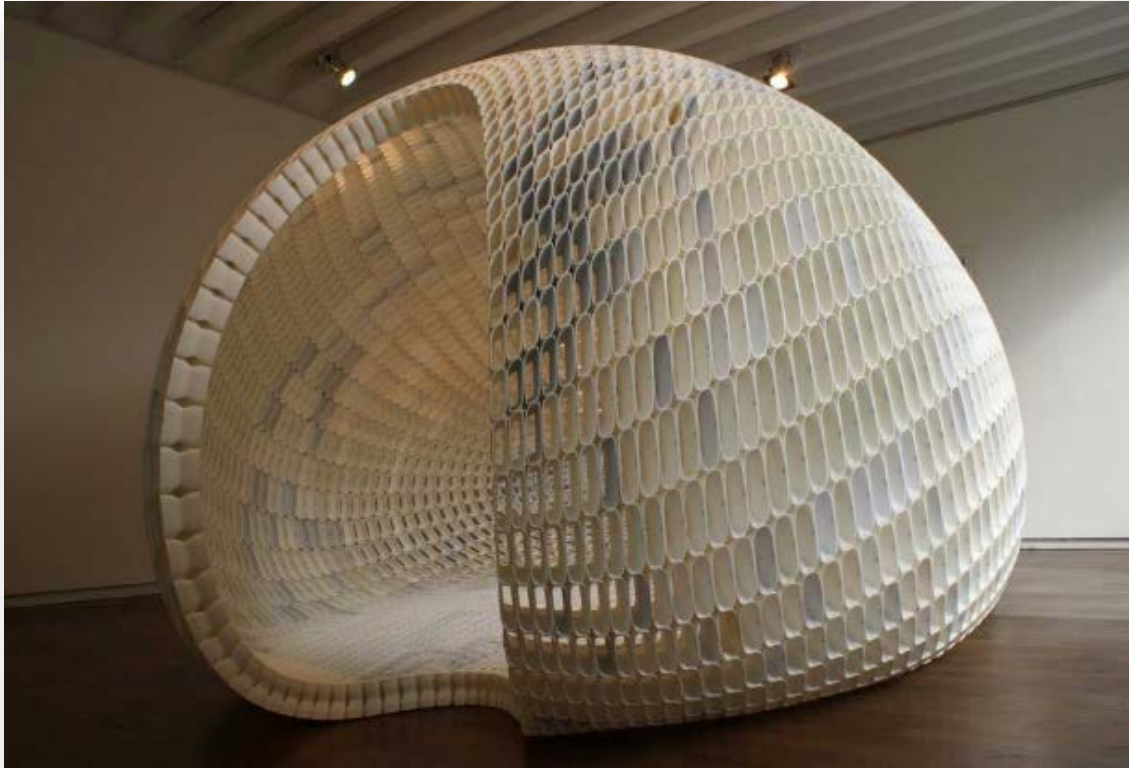
Application of OSH legislation?

- **OSH regulation applies where an 'employment relationship' exists**
 - Reality of the relationship, subordination/control, nature of work, remuneration?
- **Challenges associated with online platforms**
 - dynamics
 - strategies
 - atypical features
- **Currently, mostly decided in a reactive, case-by-case manner by judiciaries**
- **A variety of regulatory and policy approaches:**
 - Application of 'employment' to online platform work.
 - New category of 'independent worker' or a presumption of employment.
 - Providing specific protection for online platform workers
 - >> France proactive with adoption of specific law providing some basic protection for online platform workers

A challenge to stay abreast of this fast-changing area!

Additive manufacturing

Egg Project – Michiel van der Kley (NL)



“Desktop” 3D-printer: Ultimaker (NL)

- Costs around 1,000 Euros



Technology is neither good nor bad, it depends how it is implemented

■ **Need for prompt and right governance**

- Establish an ethical framework – AI and cobots
- Clarify OSH liabilities and responsibilities in relation to new systems and new ways of working

■ **Need for adapted OSH management, strategies – and regulation?**

- Decentralised (pseudo) self-employed workforce
- New risk profiles ... and Risk Assessment?

■ **Worker-centred strategies**

- Worker-centred Prevention-through-design approach
- Adaptive, socially and emotionally intelligent systems supporting workers
- Workers' involvement is key... but challenged in a virtual, individualised world
- Provision of effective OSH services to digital workers

■ **Adapted education system and training - for workers and all OSH actors!**

■ **Research and innovation**

- Fostering the quality of work, more focus on the human aspects and impact on mental health

What has EU-OSHA already done about it?

- **Scenario-based foresight “New and emerging OSH risks associated with digitalisation by 2025”**
 - Reports, summary and cartoons available [here](#)
- **“Protecting Workers in the Online Platform Economy: An overview of regulatory and policy developments in the EU”**
 - [Report and summary](#), and [seminar summary](#)
- **Expert discussion papers on “The future of work”**
- **Workshops to raise awareness and stimulate debate**

All available in several EU languages:

<https://osha.europa.eu/en/emerging-risks/developments-ict-and-digitalisation-work>

Expert discussion papers on “The future of work”

- **Crowdwork** - Prof. Huws, University of Hertfordshire, UK (2015)
- **Robotics** - Dr. Adj.Prof. Kaivooja, University of Turku, FI (2015)
- **Additive manufacturing** - Junte, Journalist, NL (2017)
- **Monitoring of workers** - van den Broek, Utrecht University, NL (2017)
- **The future of the (e-)retail sector** - Carter, HSL, UK (2018)
- **Performance-enhancing drugs** - Prof Bloomfield & Dale, Lancaster University, UK, (2018)
- **Management by Artificial Intelligence** - Dr. Moore, Leicester University, UK (2019)
- **Big Data for inspection efficiency** - Dr Dahl, SINTEF Technology and Society, NO (2019)
- **Social innovation in the context of digitalisation** - Saunders, Copenhagen Institute for Future Studies, DK (2019)
- **Exoskeleton** - Dr. Wischniewski, BAuA, DE (2019)

Coming next at EU-OSHA on Digitalisation and OSH

OSH Overview: 2020-2022

- **Advanced robotics and automation of tasks**
 - Automation of tasks, changed job contents and OSH (e.g. e-health, etc.)
 - Smart collaborative robotics (cobots) and OSH
- **Monitoring of workers and use of data**
 - Including New forms of workers' management (facilitated by AI, algorithms, gamification etc.)
- **Online platform economy**
 - Up-date of EU-OSHA's regulatory and policy developments, incl. case studies
 - Cooperation with Joint Research Centre and Eurofound (COLLEEM survey)
- **Case studies of Good OSH practices for new forms of work in the digital world**
 - Incl. Virtual Reality, Augmented Reality, smart clothing etc.
- **ESENER-3 data**
 - Questions related to Digitalisation

EU Healthy Workplaces Campaign: 2023-2024/25



Emerging risks

Anticipating change: foresight projects

Work and workplaces are constantly changing. This may give rise to new risks and challenges to workers' safety and health, which must be anticipated and addressed. Through its foresight projects, EU-OSHA aims to anticipate changes — technological, societal, political and economic — that may result in the emergence of new occupational safety and health (OSH) challenges. The objective is to support timely prevention of future OSH risks, thus ensuring that tomorrow's workplaces are safe and healthy.

Thank you for your attention!

Find out more about EU-OSHA's foresight projects at



<http://osha.europa.eu>