



# Healthy Workplaces Campaign 2020-22

## LIGHTEN THE LOAD

***PSYCHOSOCIAL RISK FACTORS FOR WORK-RELATED MSDs IN  
THE CONTEXT OF NEW FORMS OF WORK AND DIGITALISATION***

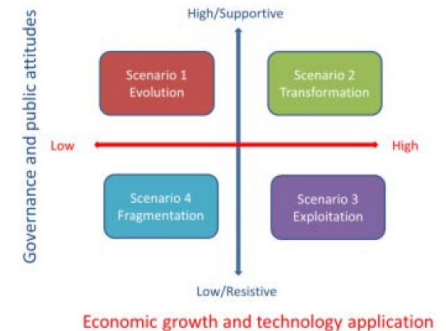
***Prof Yves Roquelaure (University of Angers, France)***

# Digitalisation and new forms of work (1)

- **Complex and multifaced phenomenon covering a wide range of jobs and working conditions**
- **Three major components** (Bérestégui, 2021; Degryse, 2017)
  - **Robotisation (in all its forms) to carry out non-routine manual and cognitive tasks**
    - **Material:** smart factories, 3D printers, driverless vehicles, etc.
    - **Virtual:** software, algorithms, production process management and control, artificial intelligence
  - **New business model: the “online-platform economy”**
    - **Big data:** merging of colossal masses of data
    - Omnipresent access to **digital platforms** (*network, on-demand physical service, commercial services*)
    - **Online outsourcing of “microwork”** / low-qualified crowd workers (*e.g., Amazon Mechanical Turk*)
    - **Online freelancing** of high-qualified self-employed workers (*e.g., translators, Upwork*)
  - **New (flexible) forms of work and new types of workers**
    - **Platform work** representing ~3-5% of the workforce, but growing fast (Huws, 2020)
    - **Crowd workers** available 24/7 almost everywhere
    - **Flexible employment** (*part time, self-employed, employees sharing, collaborative employment, etc.*)

# Digitalisation and new forms of work (2)

- **Social and health inequalities in the working population in the UE** (McKinsey Global Institute, 2020)
  - **22%** of current work activities could be **automated by 2030** (~ 53 million jobs)
  - **50%** of workforce will face **job transitions** requiring the acquisition of new skills
  - (+) major gains in **higher-skilled jobs** / (-) significant losses in **medium-skilled jobs**
  - **Workforce more diverse, dispersed and precarious**, with frequently changing jobs
- **± optimistic / pessimistic scenarios for 2025 (EU-OSHA)**



# Covid-19 pandemic : a booster of the digital economy ?

- **Strong impact on the European labour markets** (Living, working and COVID-19 e-survey, May 2020):
  - **8%** (*salaried employees*) and **13%** (*self-employed*) became unemployed
  - **Young workers, women, low/medium-skilled workers, the self-employed and platform workers**
- **Acceleration of the transition of work toward online or virtual environments :**
  - Teleworking jumped up to **40%** in the UE (April 2020)
  - Expansion of e-communications (*e.g., Zoom videoconferencing*)

→ **'New experience' of work from home will durably change perspectives on remote / virtual work**
- **Major OSH consequences**
  - **Higher levels of psychosocial distress** (*Home-based telework and virtual teamwork* )
  - **Increased work intensity** (*"essential" or "life-sustaining" workers and higher-skilled services workers* )

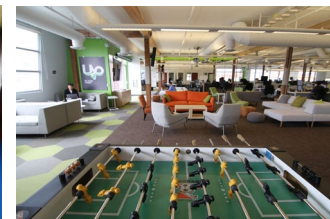
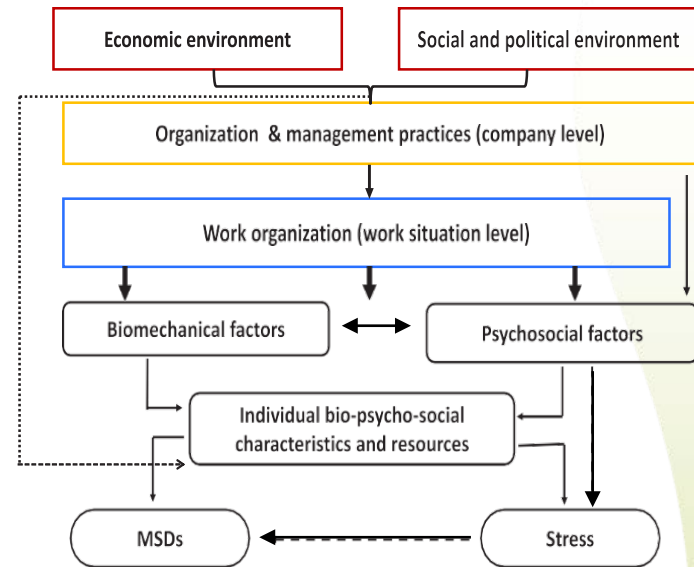
# Organizational and psychosocial factors at work and WRMSDs

## Multi-level conceptual model (Roquelaure, 2016, EU-OSHA, 2020)

- **Macro level:** economic, social, and political environments
- **Meso level:** organization of production and management practices at the production unit level
- **Micro level:** individual work situation level

## Work organization, management and HR practices:

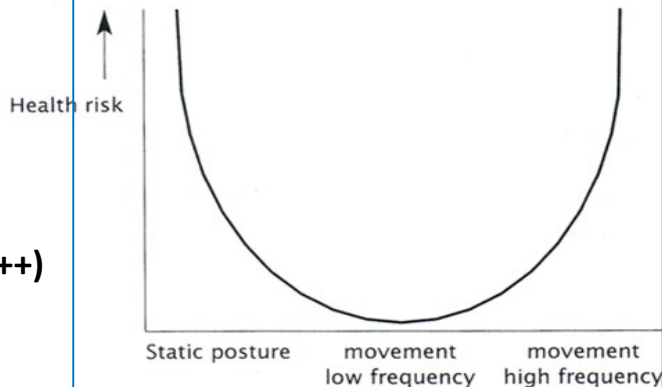
- **Domino effects** on exposure to work-related biomechanical and psychosocial factors
- Changes following the spread of **digitalisation and new forms of work**
- **Major positive/negative effects on the risk of WR-MSDs** depending on the context



# Digitalisation and new forms of work: two risk models for WR-MSDs

## 1 Low-level sustained static work

- **Soft-tissues “underuse”**
- **Biomechanical factors (+)**
  - Prolonged constrained posture
  - Sitting posture
- **Psychosocial factors (+++)**
- **Non-specific MSDs**
  - Chronic muscular **pain**
  - Neck/shoulders and back (+++)
- **Overexposed workers**
  - “Cognitive” workers (+++)
  - Visually demanding tasks
  - **New forms of sedentary work**



## 2 High-level dynamic work

- **Soft-tissues “overuse”**
- **Biomechanical factors (+++)**
  - Repetitive / forceful movements
  - Posture / Vibration
- **Psychosocial factors (+/-)**
- **Non- and specific MSDs**
  - Muscular pain
  - **Tendinopathies, nerve entrapments**
- **Overexposed occupations**
  - “Manual” workers (+++)
  - Physically demanding tasks

# Contrasted impact on biomechanical risk factors for WR-MSDs

## ■ ↓ strenuous physical work and ergonomic hazards (EU-OHSA, 2021)

- Robots
- Cobots
- Exoskeletons

## ■ ↓ High-level dynamic work

- high forces, repetitive movements
- overhead work, awkward postures

## ■ Reduction will probably be unequally applied across work situations

- e.g., lot size manufacturing, voice picking, etc.,

## ■ ↑ sedentary work

- On-screen control and monitoring activities
  - production sector (smart factories, etc.)
  - online services platforms
- Teleworking and work at home : ↑ time spent in sitting posture (Oakman et al., 2020)

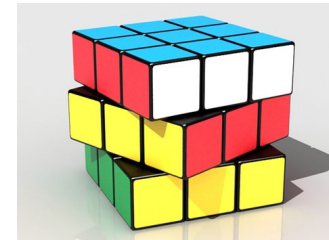
## ■ ↑ Low-level sustained static work

- trunk, neck and upper-limbs

## ■ Reduced level of daily exercise and energy expenditure

# Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- **The new forms of work and digitalisation reinforce the current shifts in patterns of exposure to workplace hazards in the UE**
- **Counterbalance the expected reduction of the physical workload ?**
  - ↑ task repetitiveness, cognitive workload, and psychosocial demands
  - Permanent electronic monitoring of workers' performance
  - Algorithmic human resources management
- **Increased exposure to the main organisational and psychosocial risk factors for WR-MSDS**
  - **Intensity of work**
  - **Autonomy and job control**
  - **Quality of the social relations at work**
  - **Job insecurity**
  - **Emotional demands at work**
  - **Working time - boundaries between work and personal life**





# Contrasted impact on risk factors for WR-MSDs: psychosocial factors

## ■ Work intensity

- **Digital economy will further the work intensification observed in Europe** (EU-OSHA, 2019)
- **High psychological demand and “technostress”** (Berg-Beckhoff et al, 2017)
  - ICT-mobile (tele)workers : greater **work intensity and level of stress** (41% vs 25%) (2015EWCS)
  - Digitally-induced **work intensification mediates negative mental effects** rather than use of ICT per se (Borle et al., 2020)
- **Major Influence of the job content** (Degryse, 2016; EU-OSHA, 2018; McKinsey Global Institute, 2020)
  - **Highly mentally demanding creative high-tech jobs** with a large autonomy (highly qualified workers)
  - **Physically- and mentally demanding monotonous repetitive jobs** devoid of operational leeway (low qualified workers, crowd platform workers) and at high risk of WR-MSDs

# Contrasted impact on risk factors for WR-MSDs: psychosocial factors

## ■ **Autonomy and job control**

- **Digitalisation may either reinforce or diminish workers' autonomy depending on ergonomic design, management practices and implementations strategies**
  - **Mobile (tele)workers : greater autonomy at work and working time autonomy** (2015EWCS)
  - **Platform workers: limited autonomy** because of the algorithmic management and permanent controls (De Groen, 2018)
- **“Paradoxical autonomy” : greater independence provided by digital technologies or feeling to be obliged working everywhere or all the time ?** (Borle et al., 2020)
- **New forms of “Digital Taylorism”:** collaborative robots with automated decision-making influencing assembly line workers might reintroduce old Taylorian management principles (e.g., *agile “lot size manufacturing”*)

# Contrasted impact on risk factors for WR-MSDs: psychosocial factors

## ■ **Quality of the social relations at work**

- **Automation and algorithmic management will increase the number of people working remotely, often individually without contact with colleagues or in competition with them**
- **Fulltime teleworking may lead to physical and social isolation, reducing social interactions at work, either with colleagues or managers → ‘Job iso-strain’ situations at risk of WRMSDs**
- **Lack of information on how algorithms work may affect workers’ sentiments of organisational justice**
- **Unfair pay and procedure inconsistencies may reinforce the feeling of effort/reward imbalance**

# Contrasted impact on risk factors for WR-MSDs: psychosocial factors

- **↑ Job insecurity**
  - Diversity and precariousness of employment forms
- **↑ Emotional demands at work**
  - Permanent surveillance and/or public evaluation (platform work, telework)
  - Unfair and conflictual relationships with customers and requesters (on-demand physical services workers, *e.g., Uber or Deliveroo*) (Bérestégui, 2021)
- **↑ Working time - blurred boundaries between work and personal life**
  - ICT-mobile workers or home-based teleworker (2015EWCS, Oakman, 2020)
  - Voluntary nature and informal agreement between employees and managers ?

# Resulting impact of digitalisation on the risk of WR-MSDs will depend on the jobs and contextual factors at several levels

## Top jobs in the digital economy (Degryse, 2016)

- Data analysts, data miners, data architects
- Software and application developers
- Specialists in networking, artificial intelligence, etc.
- Designers and producers of new intelligent machines, robots and 3D printers
- Digital marketing and e-commerce specialists

## Digital 'galley slaves'

- Data entry or filter workers
- 'Mechanical Turks' working on the digital platforms
- Uber drivers,
- Collaborative casual odd-jobbing

## ■ Macro level

- Sectors and occupations
- Socioeconomic position
- Forms of employment
- Digital technologies
- ...

## ■ Meso level

- Specific management context
- Autonomy given to the workers
- Implementation strategies
- ...

## ■ Micro level

- Ergonomics of the workstation
- Training
- Individual characteristics
- ...

# To conclude:

- **Digitalisation will bring new and emerging OSH challenges, but also opportunities depending on how the technologies will be implemented, managed and regulated**
- **One of the key challenges for research and prevention will be keeping at pace with the fast development of digital technologies and new forms of work**
- **Surveillance, risk assessment and OSH policies should be adapted to more flexible working patterns and forms of employment**

# Thanks !

# Questions ?

**Your feedback and ideas are welcome !**

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