



Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

Future Challenges to the Working Environment Comments of an Accident Insurer

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How is life in 2020?

WWW-FUTURECHECK-EU

[\(Click to play video from Youtube\)](#)

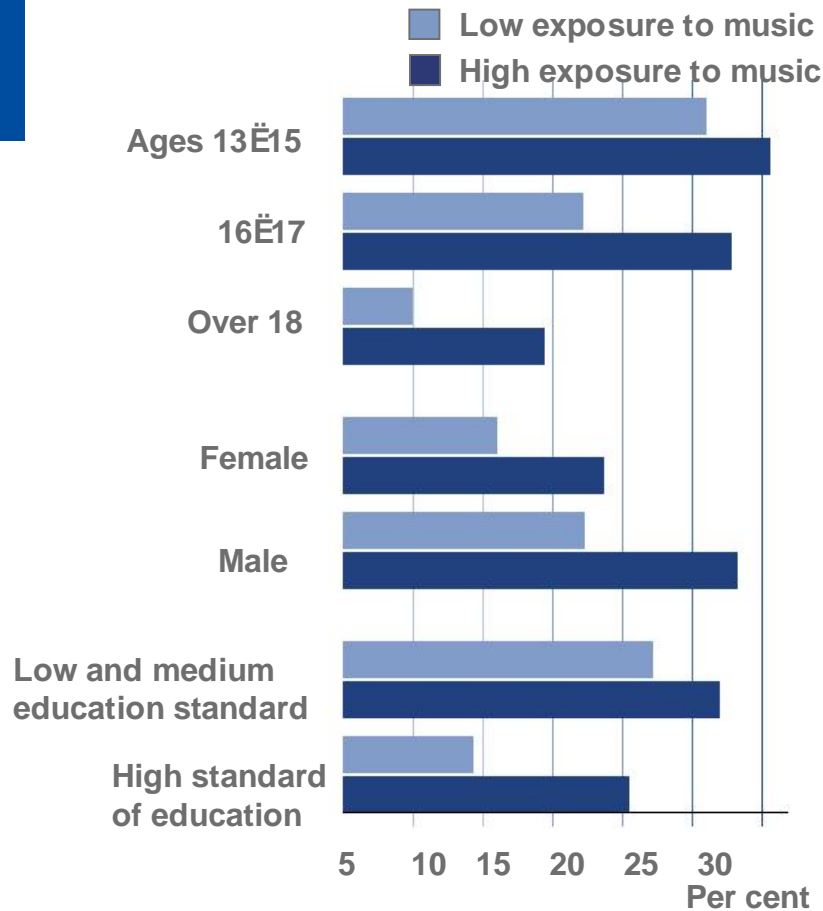
Overview

- Sources
- Challenges
 - Life-style
 - Demographics
 - Technology
 - Globalization
 - Increase in natural disasters
- Answers to the key questions

My sources are European.

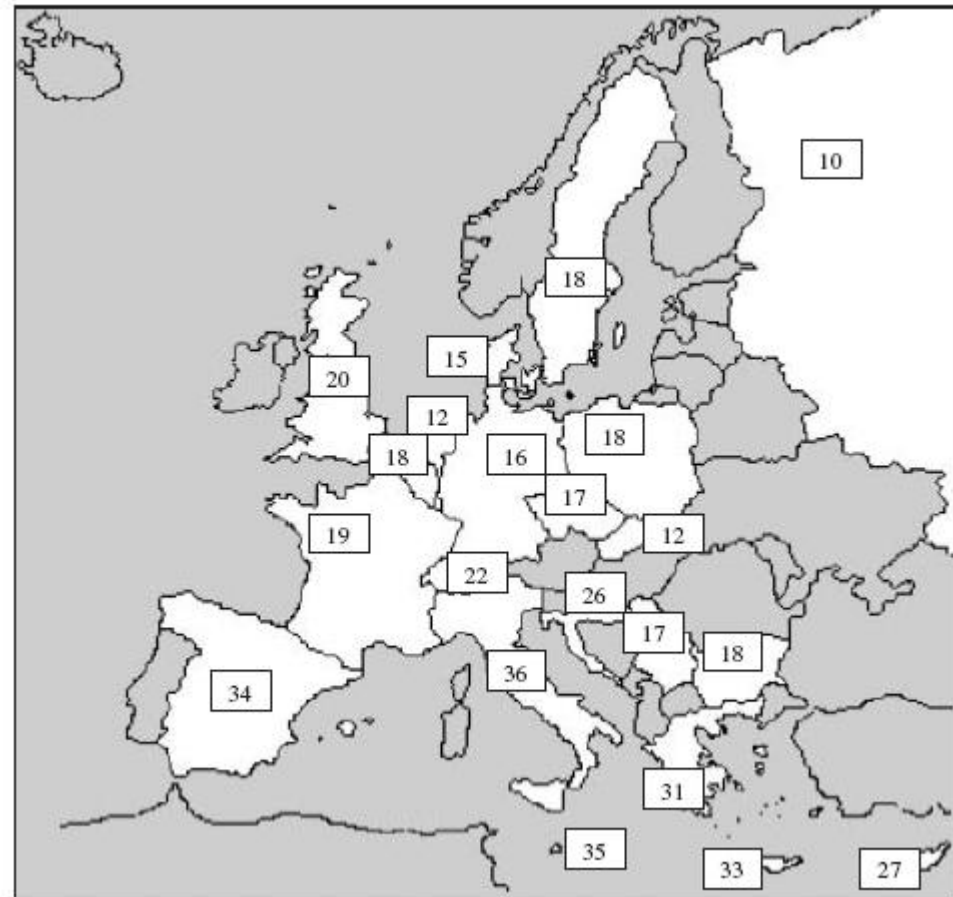
- Horizons 2020 . www.siemens.com/horizons2020
- Expert forecasts on emerging risks relating to OSH .
<http://osha.europa.eu/en/riskobservatory/>
- Strategic Research Agenda of the European Technology Platform
%Industrial Safety+- www.industrialsafety-tp.org
- New Forms of Physical and Psychosocial Health Risks at Work -
<http://www.europarl.europa.eu/activities/committees/studies/searchPerform.do>
- New and Emerging Risks in OSH . www.newoshera.eu
- Joint German OSH Strategy . www.gda-portal.de

Facts: Life-style



Prevalence of noise-induced hearing loss among adolescents

(Source: Gesundheitsberichterstattung des Bundes)



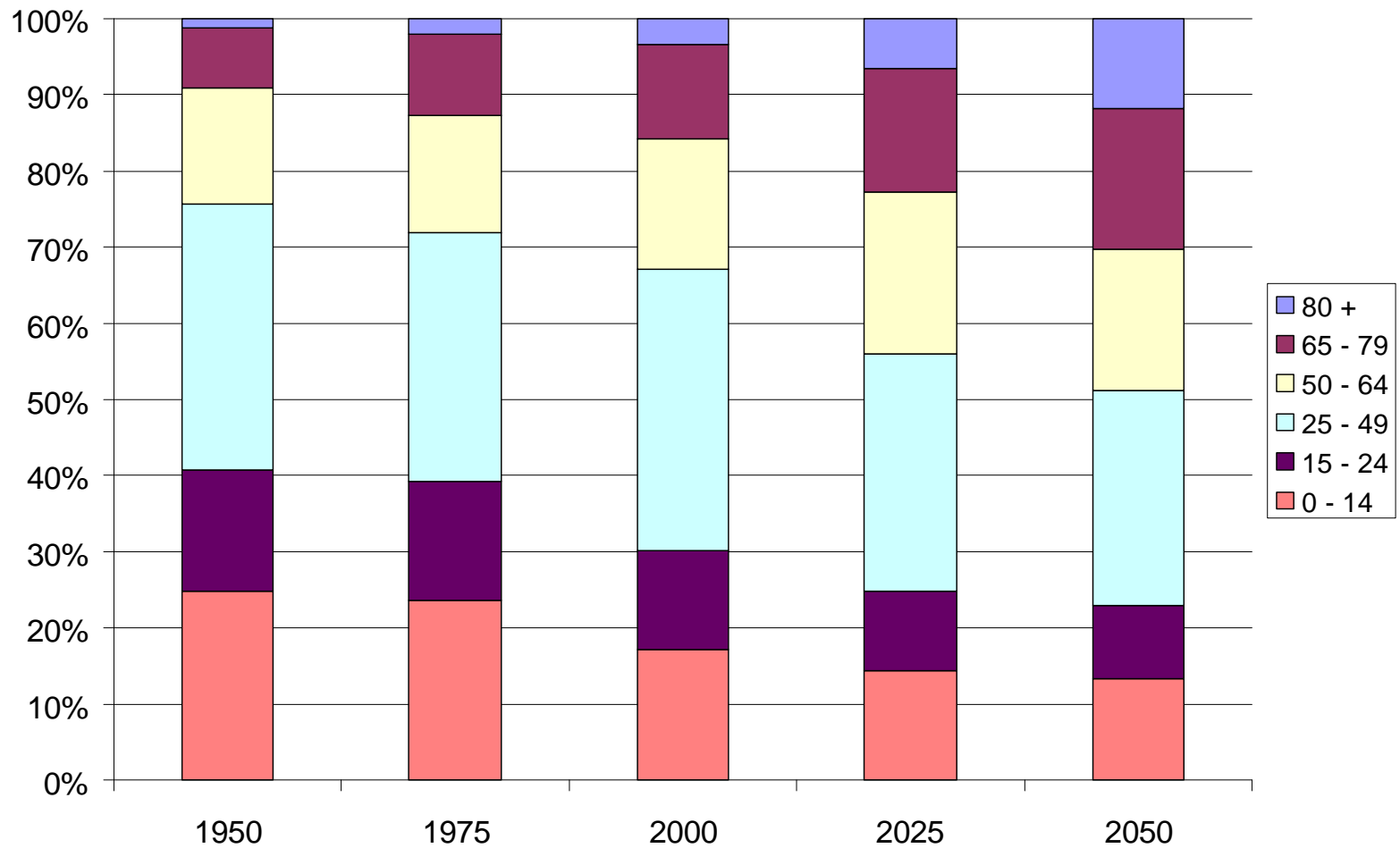
Percentage of 7- to 11-year-olds with overweight and obesity

(Source: obesity reviews 4, 195 . 200,2003)

Challenges: Life-style

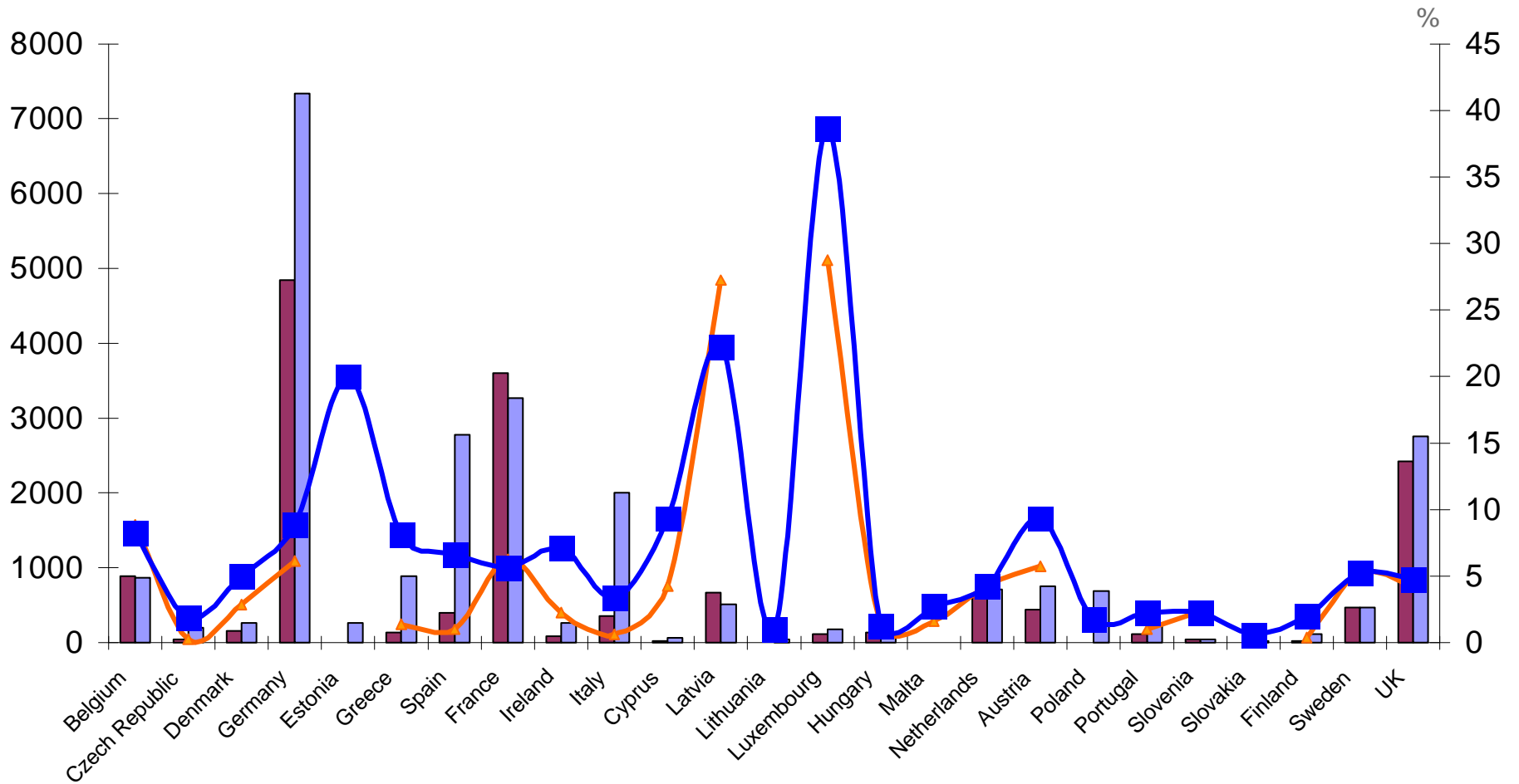
- The life-styles of young people, and not only in Germany, are strongly affected by **poor diet** and **intensive listening to music** along with **extreme sunbathing** and the **over-organization** of leisure time.
- Changing habits acquired during childhood is very difficult, if not impossible. Safety and health awareness have to be instilled at an early age if behaviour at the workplace is to benefit.
- Health education needs to start in preschools and schools. There is a large deficit in this area in Germany.

Facts: Demographics in the EU

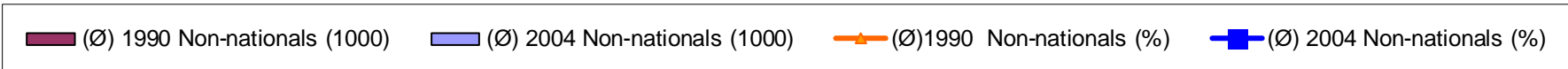


Source: UN World Population Forecast, 2002; Eurostat 2004

Facts: Migration in the EU



Source: Eurostat Migrations statistics, 2008

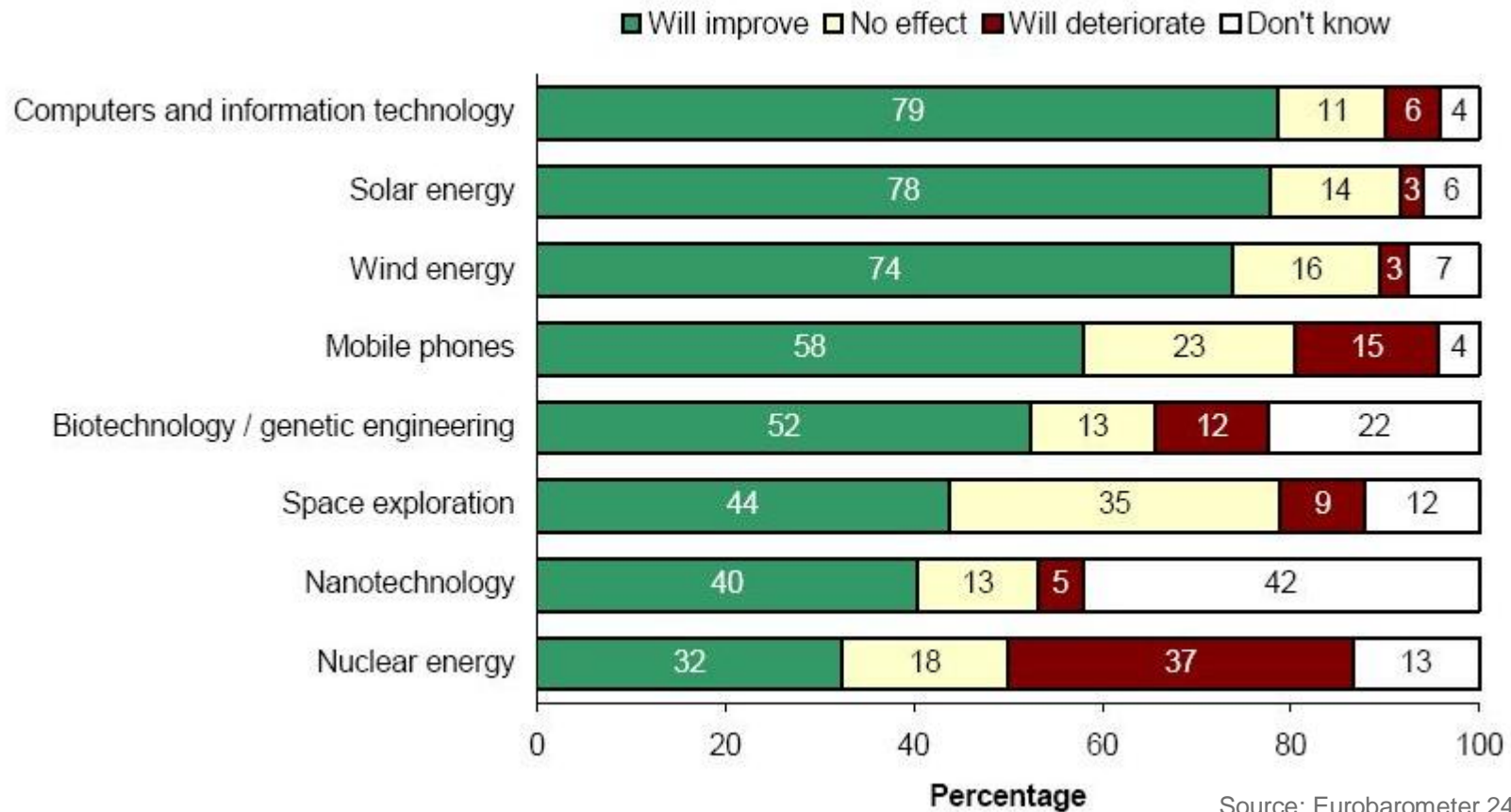


Challenges: Demographics

- In Germany, the issue of demographic change and its consequences have to be addressed at work. This can entail **life-long learning, job rotation, horizontal careers, secondary and tertiary prevention and rehabilitation**.
- A larger proportion of the population will require **old-age care and nursing**. New strategies are necessary.
- To ensure health and safety, we need **intercultural teams** at the workplace with effective leadership. The research topics are **intercultural training** in schools, integration of OSH in companies with **international management, intercultural guidance and intercultural safety briefings**.

Facts: Technological innovation

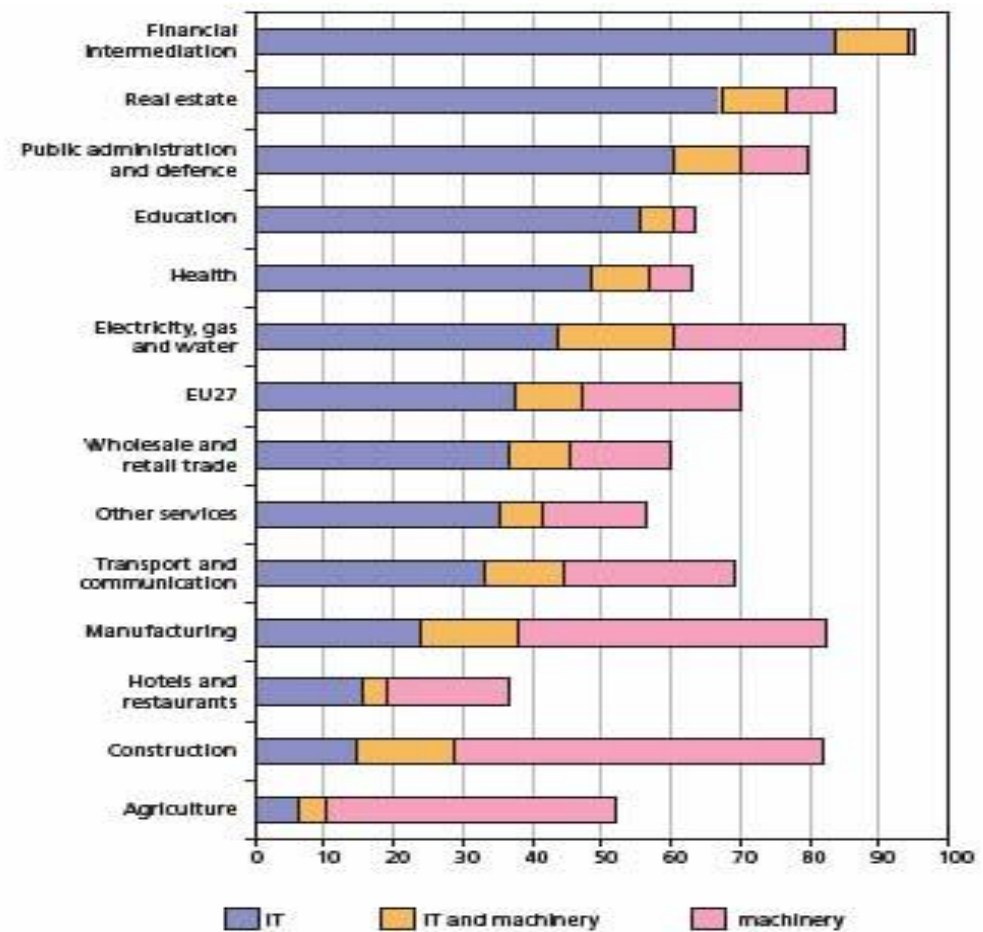
Optimism and pessimism with regard to eight technologies in 2005



Source: Eurobarometer 244b

Challenges: Computers, information technology, mobiles

- Growth of information technology at all workplaces
- Mobile workplaces, worldwide networking, progress in miniaturization and improvements in computer performance will affect all workplaces.
- Collaborative machinery with direct human-machine interaction is the challenge for future manufacturing.
- Research topics include virtual reality for workplace design and the usability (user-centred design) of complex technology.



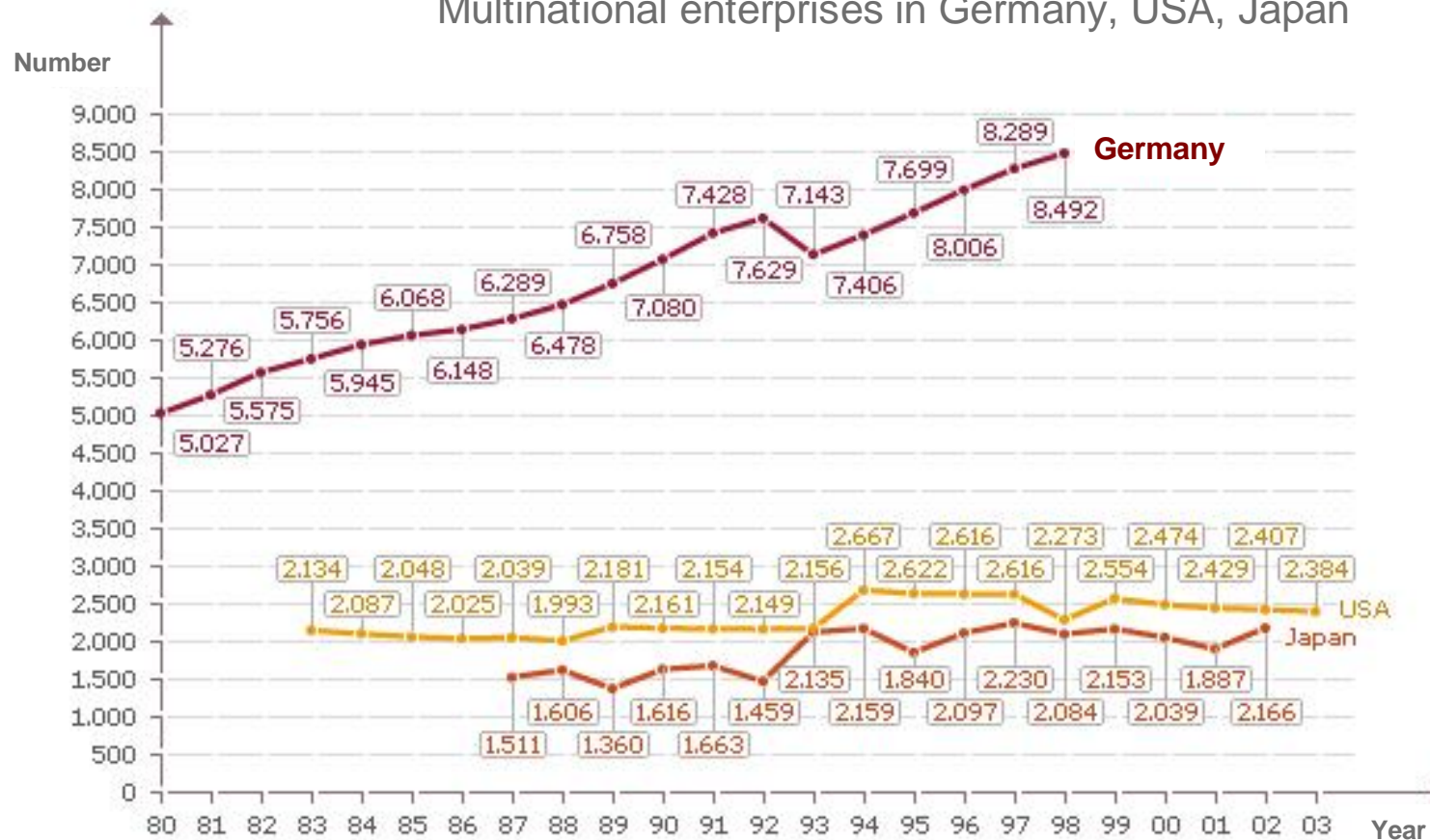
Source: European Foundation for the Improvement of Living Conditions (2007). Fourth European Working Conditions Survey.

Challenges: Biotechnology, genetic engineering, nanotechnology

- A revolution in **medicine** involving **theranostics**, **biochips** and **biosensors**, **bioinformatics**, **genetic engineering** and **pharmacogenomics** will increase the use of **biotechnology**.
- New **materials for technological purposes** (conversion of wood or plant fibres into **ceramics**, **artificial spider silk**, **protective biolayers**, **artificial skin tissue**) will be produced in **bioreactors**.
- Nanoparticles will yield **new nanomaterials** (**fillers for polymers** to make them stable, wear-resistant, heatproof and invisible; **nanotubes** with excellent conductivity for electricity and heat, with improved tensile strength; **nanoparticle coatings** with the lotus effect; lightweight construction using **nanofoams**).
- **Nanoelectronics and nanobiotechnology** will result in new electronic components (**quantum computing**, **nano-CMOS**), **gene therapy** and **molecular prosthetics**, **implantable**, **biocompatible nanomaterials**, and **nanomaterials for drug delivery** and **biosensors**.
- OSH research will be necessary for **exposure measurements** and **toxicological investigations** in the fields of these technologies.

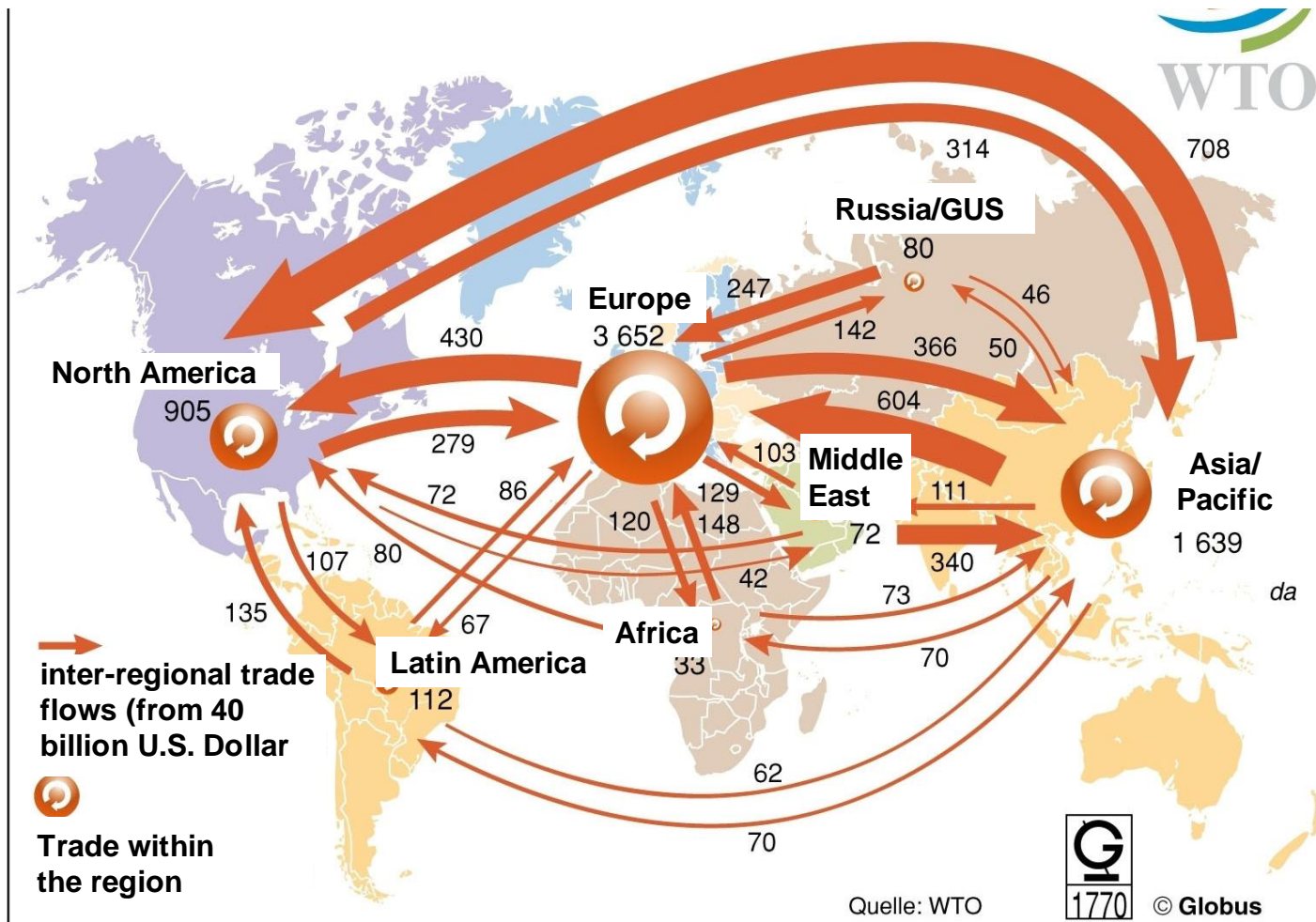
Facts: Globalization

Multinational enterprises in Germany, USA, Japan



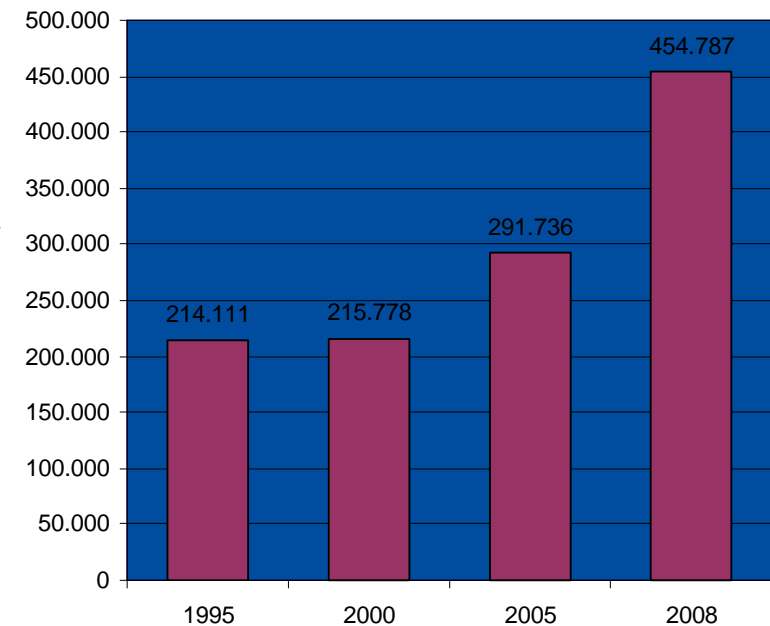
Source UNCTAD: Division on Investment, Technology and Enterprise Development
Stand: 11.2006

Facts: Globalisation



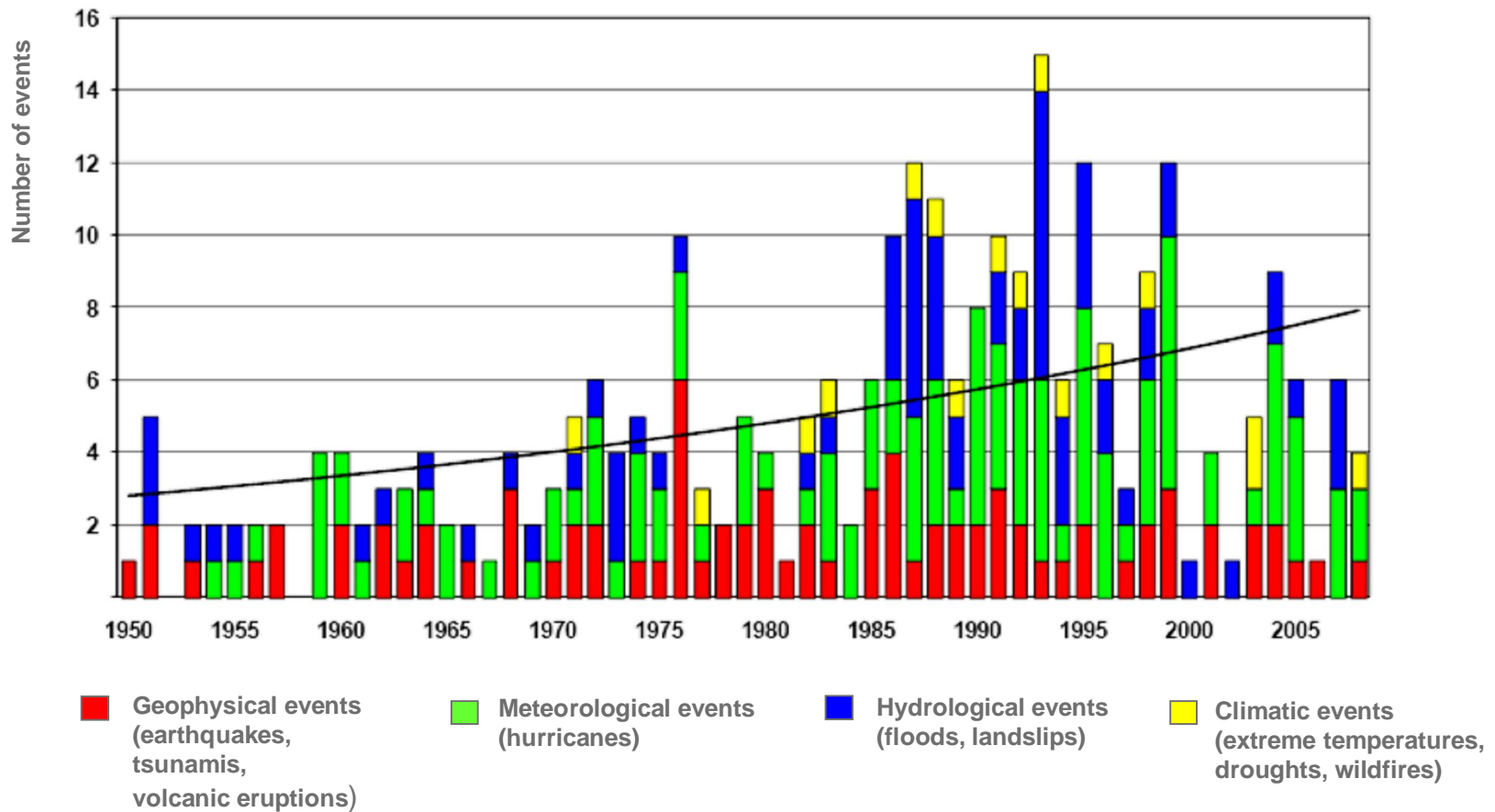
Challenges: Globalization

- Globalized companies operate globally: networking, language skills, travelling, multicultural teams, mobile workplaces, flexible working hours.
- Globalization leads to more competition: pressure on costs, outsourcing, temporary and precarious employment, high work intensity, unstable labour market.
- Research is necessary in the field of OSH at mobile IT-workplaces, OSH in outsourced companies, workers' psychological wellbeing and health, traditional OSH topics in multicultural companies and in SMEs.



Reportable diseases in Germany

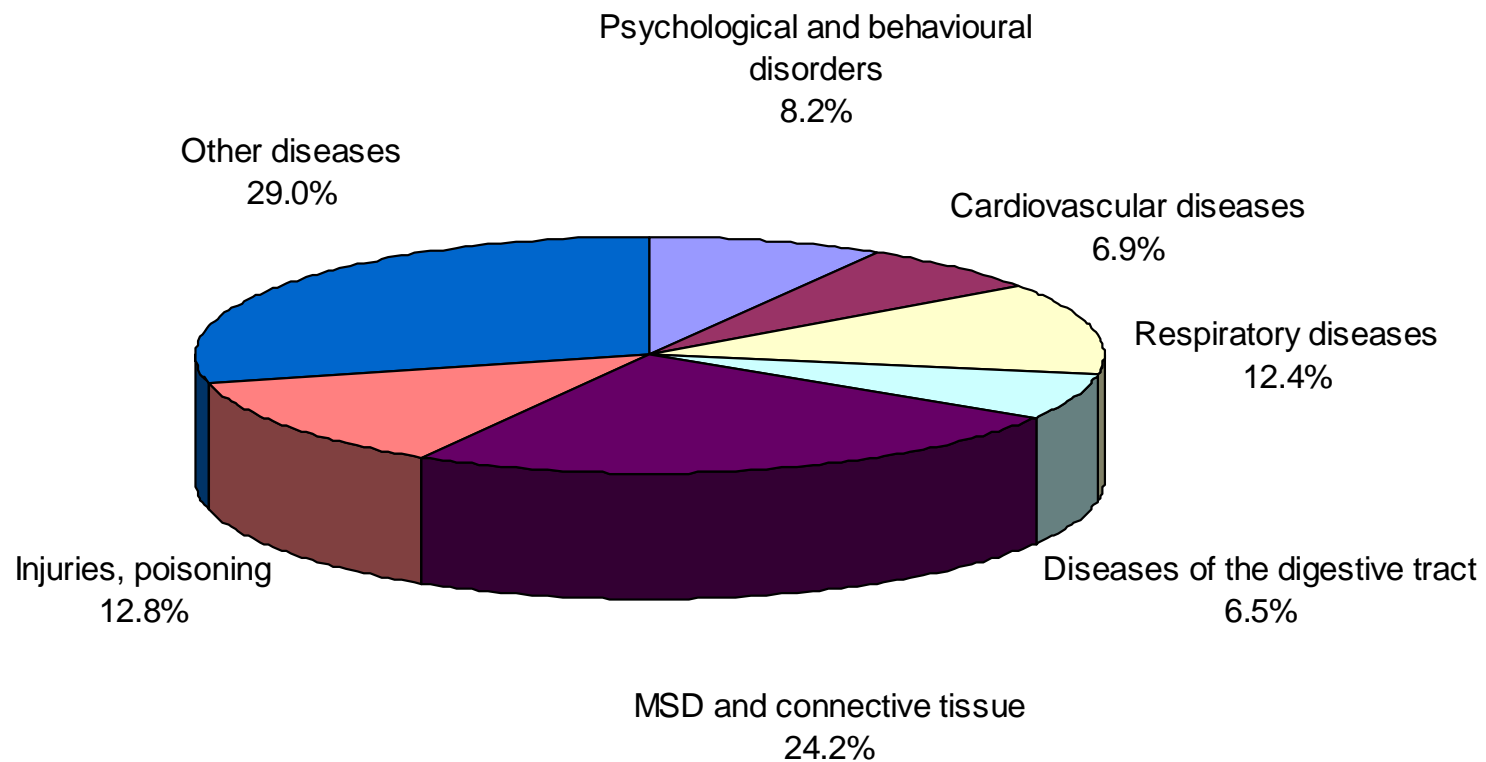
Facts: Increase in natural disasters



Challenges: Natural disasters

- There has been an increase in natural disasters worldwide, and Europe is no exception.
- Natural disasters can affect industrial plants beyond the scope of their **normal safety provisions** and cause technological hazards. This is because such disasters affect **several industrial facilities simultaneously** and services like water, power, and communications may not be available. **Most industrial sites are not prepared for unexpected natural phenomena.**
- The OSH of **relief work** will be impaired by natural disasters. The spectrum of the possible work-related hazards that may be encountered is extremely broad and includes **electrical hazards, hazardous substances, musculoskeletal hazards, fire, heat exposure, confined space, mental stress, irregular and unpredictable working hours, dealings with aggressive and violent people, contact with wild animals or unsupervised livestock, poor management and lack of coordination.**
- Research is required into the development of technologies that tolerate natural and other unexpected hazards. The OSH of relief work needs to be improved.

Facts: Classical hazard prevention



Working days lost due to illness in Germany in 2007

Challenges: Classical hazards

- A change in **risk awareness** in the service economy will bring new aspects of old hazards to the fore: **Combined exposure** (vibration and awkward postures, MSD and psychological risk factors, ototoxic substances); **new risk assessments** (impact-like vibration, sick building syndrome, toners for printers/copiers, passive smoking).
- Increase in **familiar diseases**: **Allergies** (induced by epoxy resins, isocyanates, acrylates), **arthrosis** of the **knee** or **hip**, **repetitive motion**
- Existing knowledge is not exploited in **SMEs**: Lack of **ergonomic improvements**, **insufficient awareness** and **control of biological and chemical risks**.
- Pressure on costs calls for **stronger justification** of OSH expenditure: Need for **OSH culture** and **systematic and comprehensible prevention** will affect the changing working environment.

Changes in the working environment

- Adverse life-styles will increasingly affect our working environment.
- Demographic changes combined with growing migration will affect the future workforce.
- Information technology, biotechnology and nanotechnology are the driving forces behind future technological change.
- Globalization with intensified competition will dramatically affect the way work is organized.
- Natural disasters may give rise to new technological hazards.
- Classical hazards will not disappear in the near future.

Challenges with respect to practical prevention

- To change habits we need to start in preschools and schools.
- Companies have to be encouraged to react to demographic change. Intercultural teams will be typical of future companies.
- Mobile workplaces, collaborative machinery, virtual reality, biological material production, nanomaterials, nanoelectronics and nanobiotechnology will dominate OSH in 2020.
- The pressure on costs results in outsourcing, temporary and precarious employment, high work intensity and international cooperation. This will favour epidemics and pandemics.
- Natural disasters will be a challenge for relief workers and the design of large industrial plants.

Trends in the prevention of MSD

- In Germany, there will be an increase in recognized MSD-related occupational diseases in the near future. Exposure assessment and the prevention of MSDs are one of the key tasks of our institution for the future.
- MSDs and other illnesses are encouraged by lack of exercise. To prevent MSDs, new ways of changing the life-styles of exposed workers need to be found.
- The future may bring combinations of musculoskeletal stressing with other forms of exposure (e.g. vibration, mental stress).
- Human-centred design needs to take ergonomics into account.

Emerging risks in terms of chemical and biological hazards

- Allergies are increasing and should be combated more consistently.
- A future focus will be on the prevention of pandemics.
- Genetic engineering and biotechnology will be an OSH topic of the future.
- Toxicology will focus on nanotechnology and especially carbon nanotubes.
- In Germany, passive smoking, the sick building syndrome and insufficient awareness and control of biological and chemical risks will have to be addressed in the coming years.
- Future risk-based occupational exposure limit values for carcinogens may require new analytical methods because of lower detection limits.

Future role of workplace health promotion

- Due to the fact that adverse personal life-styles affect workers' behaviour, health promotion at the workplace will grow in importance.
- The pressure on costs demands programmes that are demonstrably effective in reducing days lost due to illness.
- Psychological wellbeing and health will be of increasing importance and an important field for workplace health promotion.
- In Germany, this is an area where health and accident insurers will have to cooperate closely.

Gaps in our knowledge: Need for new research

- Bringing classical health promotion to preschools and schools
- Implementation of life-long learning, job rotation, horizontal careers, secondary and tertiary prevention and rehabilitation to keep the elderly workforce at work and fit for its duties
- Intercultural training in schools and companies and integration of OSH in companies run by foreign management
- Healthy mobile workplaces dominated by information technology
- Collaborative machinery, human-centred design and virtual reality strongly affect future production processes
- Risk assessment for biotechnology, genetic engineering and nanotechnology

Gaps in our knowledge: Need for new research

- Improvement of OSH in outsourced companies
- Evidence-based intervention to improve workers' psychological wellbeing and health
- Development of technologies and procedures that tolerate natural and other unexpected hazards and disasters
- Implementation of OSH culture in SMEs
- Exposure measurement and risk assessment for multifactorial risks

Working Environment Strategy 2010 - 2020

Thank you for your attention

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