

// DIGITALISATION AND THE WORLD OF WORK_



Council of European Employers
of the Metal, Engineering and
Technology-based Industries



//CONTENTS

INTRODUCTION_	4		
<hr/>			
DIGITALISATION IS AN OPPORTUNITY FOR INDUSTRY AND FOR THE EUROPEAN ECONOMY	4		
DIGITALISATION IS CHANGING THE WORLD OF WORK	5		
<1.0>			
SKILLS AND COMPETENCES_	6		
<hr/>			
1.1 SKILLS AND COMPETENCE NEEDS FOR A DIGITALISED MET INDUSTRY	7		
1.2 DELIVERING THE RIGHT SKILLS	9		
1.3 PRIORITIES FOR REFORM – HOW TO MEET THE COMPETENCE DEMANDS OF A DIGITAL MANUFACTURING INDUSTRY?	9		
<2.0>			
WORK ORGANISATION_	12		
<hr/>			
2.1 FLEXIBLE WORKING HOURS	14		
2.2 FLEXIBLE WORKPLACES	15		
2.3 FLEXIBLE FORMS OF EMPLOYMENT AND DEFINITION OF 'EMPLOYEE'	15		
2.4 COLLECTIVE BARGAINING	16		
<3.0>			
HEALTH AND SAFETY_	18		
<hr/>			
3.1 DIGITAL INDUSTRY – BLURRING BOUNDARIES BETWEEN PROFESSIONAL AND PRIVATE LIFE	19		
3.2 MAN-MACHINE INTERACTION	20		
3.3 TELEWORKING	21		
3.4 AGEING WORKFORCE	22		
<4.0>			
DATA AND THE WORLD OF WORK_	23		
<hr/>			

INTRODUCTION

DIGITALISATION IS AN OPPORTUNITY FOR INDUSTRY AND FOR THE EUROPEAN ECONOMY

Europe has a strong industrial ecosystem with technological development as its single most important factor behind prosperity and rising living standards. CEEMET, the Council of European Employers of the Metal Engineering and Technology-based industries, wants to see European manufacturing leading the drive towards new technologies and playing a central role in future growth across the European economy. A well-developed infrastructure and skilled workforce are pivotal factors in successfully transforming industry. Expectations are high, but only through a truly digital Europe – and a digital single market - will industry be able to reach the set goal of contributing 20% of EU GDP by 2020.

Significant issues need to be addressed now if Europe is to keep up with its competitors around the globe. These include questions about digital infrastructure, cybersecurity and data sharing, regulatory environment and industry standards.

Digitalisation was once considered as something very special; today, it is the new normal. Attempts to stop or slow down

digitalisation in Europe will ultimately have a negative impact on our growth, jobs and wealth creation.

We should stem efforts to protect the past and the present from the future and instead contribute to shaping the future that we want. Digitalisation is sweeping both industry and society with full impact.

The automisation and robotisation we have seen in the past has sped up. Digitalisation has a continuous and unprecedented impact on how companies operate. It influences all aspects from development to production and logistics. It is challenging business models and changing the work place and the way we carry out work. Whereas many of the existing studies look at the changes to industrial production and processes, **the CEEMET report is a first step to address this very last point – the way we carry out work in the Metal, Engineering and Technology-based industries (MET).** Based on current trends, discussions and company experiences, we have put together a starting point for discussion.

DIGITALISATION IS CHANGING THE WORLD OF WORK

Digitalisation is driven by technological progress but the **human factor** is at the heart of this development. Anticipating what the industry of the future will look like is a difficult task – to understand what potential changes it might bring to work life is even more challenging. Nevertheless, **the discourse on emerging technologies is also about work organisation, human potential and the values it unlocks.**

In general, digitalisation raises questions about our current and future work models, including future forms of employment, how we define ‘employee’ as well as the role of Social Partners. It prompts questions as to whether the legislation that today regulates working life is fit for the digital future. And more in general, how can we sustain and pay into the welfare models that provide pensions and other benefits?

Digitalisation will change occupations in the MET sector. It will change how and where people work. This will lead to changes in business models and management. The ability to successfully manage this change will be central to whether the European MET industries and in particular its large number of small and medium-sized companies can keep their competitiveness. Capitalising on the digital transformation will benefit the customer, the company and the employees.

The awareness level of digitalisation across the Member States varies significantly and

the discussion among CEEMET members still shows differences. However, the time is ripe to kick-off a **discussion that is facts-based, open and not guided by fear** in order to develop a vision for European manufacturing together with different stakeholders.

In our report, we focus on what we think the emerging issues could be in the world of work, stemming from digitalisation.

We have set out four general areas for debate:

- skills & competences
- work organisation
- health & safety
- data in the world of work

What does the workplace of the future look like in the 4th industrial revolution? How will we work and how will the digital work environment affect us? These are some of the questions we have asked ourselves for this report. Some common trends, first common findings and good examples have been identified. As the digital environment is constantly changing, this document should be considered as a starting point, a snap-shot of current and looming issues. It is a first step in providing input to a broader debate about digitalisation and the changes it brings to our society and the way we work.

<1.0> SKILLS AND COMPETENCES_

HIGHLIGHTS://

- There is a need for digital leadership with an understanding of how to create business models and processes for the digital world.
- The skills demand for digital industry must be addressed by focusing on Science, Technology, Engineering and Mathematics (STEM) skills and an improved cooperation with companies at all levels.
- All Member States need to integrate digital learning across all curricula. Learning should include using digital equipment understanding, controlling and creating it.
- The importance of life-long learning is growing. The responsibility of employees for their own employability must be strengthened, backed by appropriate support.

From the employer perspective, qualification is a key challenge and one that needs decisive action. The skills challenge in the manufacturing sector is becoming more pronounced as industry becomes more digitalised. Manufacturers' plans to drive productivity improvements and to capitalise

on the digital industrial revolution could be derailed because many countries across Europe are struggling to provide the right quantity and quality of skills to meet the sector's needs.

The digitalisation of products and of processes, as well as the digitalisation of work organisation, is leading to changes in the demands in MET industries workforce skills and competences. The skill sets required in

Social Partner Agreement on "Training and Qualification for industry 4.0"

In Germany the Social Partners of the MET industry Gesamtmetall, IG Metall, VDMA and ZVEI negotiated an agreement signed in April 2016 titled "Training and Qualification for industry 4.0 – Managing change successfully." The Social Partners have committed to analysing all industry 4.0 relevant vocational education and training occupations and advanced vocational training. The Social Partners are organising this process and are involving company experts as well as scientists in order to develop concrete proposals for further measures by the end of 2016.

both old and new occupations in the MET industries are changing. For some jobs and occupations this transformation will be rather slow while for others change comes more rapidly. There is already today on the labour market a high demand and need for people with IT competence. Engineers and programmers are lacking, but other occupations will also require



increased digital literacy – and being a digital native will not be enough.

IT skills are becoming more relevant at all levels, but other skill demands also emerge. For instance, there is a pronounced need for **digital leadership** with an understanding of how to create business models and business processes for the digital world.

Digitalisation and the demands it places on education and training in particular cannot be seen in isolation from other, broader societal developments. The demographic development in Europe is a major factor in terms of skills and competence in the MET

industries, as the average age of the MET workforce is higher than in many other sectors. Together, these factors intensify each other. Therefore, developing the right pipeline of talent for the future will be crucial.

Businesses must work closely together with governments and other stakeholders to map a future view of skill demand versus supply and together consider what a curriculum for the future might look like. This process should be complemented by improved statistics about skills gaps, for instance through common surveys by Eurostat.

<1.1> SKILLS AND COMPETENCE NEEDS FOR A DIGITALISED MET INDUSTRY_

Overall, because of rapidly evolving technologies, strong basic skills are being emphasised – at all levels. Specific skills for current technologies will develop in

the workplace – and employees will need to continue learning throughout their careers to keep pace with technological progress.

Whilst it is difficult to predict the exact skills requirements beyond 2020, we can **identify a range of factors** that are likely to influence skills demand in the future. These influencing factors can help us build up a picture of the potential skills requirements beyond 2020.

The emergence of new technologies and trends towards high-value goods and services will continue. Production work will transform and become more multifactorial in terms of control and decision-making tasks (experience-based decisions). While production work is likely to change from production today, it does not automatically imply that it will become more difficult.



For instance, employees will be helped by mobile assistance systems as standardised routine tasks will be transferred to cyber-physical system (CPS) controllers.

Moving towards high-value goods will mean at least a continued if not increased demand for technicians, potentially in management capacity, as well as a continued demand for scientists, technologists and engineers, with demand on higher-level skills to fill professional roles.

- **Generic technical skills, software and hardware integration** will be the most wanted skills. This must be addressed through an enhanced focus on STEM skills and an enhanced cooperation between companies and education providers, especially the higher education institutions where cooperation is lacking behind.
- With increasing integration of software in products we will need more **electronics and software engineers** in the product and process development. The increasing digitalisation of production also means that more **engineers within robotics and automation** will be required. Focused **programming and coding skills** will be essential in the coming years in manufacturing industry.
- **Analytical skills** will also be sought after. The amount of data from sensors and platforms is increasing tremendously and to make sense of the data and to create new business models, advanced analytical skills are needed.
- **Cybersecurity skills** will be central. Increasing amounts of software and internet everywhere in industry also means that cyber threats are everywhere.

In addition to technical competence, working with more complex production will also continue to demand **soft skills** in the industry, e.g.

- ability to cooperate
- ability to take responsibility
- problem-solving ability
- ability to communicate – also across different business cultures.

<1.2> DELIVERING THE RIGHT SKILLS_

Trying to determine how skills and competence profiles will change for certain occupations in the MET industries is important, but it is perhaps more pressing to ask how we can deliver training that will meet the rapidly emerging demands, both in the existing workforce as well as in the education and training systems as a whole. As it stands, the educational systems around Europe are not fully prepared to meet the demands of new skills and emerging jobs.

The lack of sufficient skills and competences as well as sufficient resources for technological equipment and updating or upskilling teacher qualifications at educational institutions are major challenges that urgently need to be addressed through reform.

Manufacturers will also need to increase investment in training existing employees – in line with company needs - to keep up with new processes. A major challenge is to increase the digital skills of current workers, and in particular older ones, which means creating an offer of training on digital skills. That reflects the needs of the company.

The trend to acquire future skills through work-based learning will continue, with a focus on ensuring that training provision meets the changing demands of manufacturing in the future. Work-based learning is a central part of excellent vocational education and training (VET) that benefits both companies (of all sizes in EU28) and students. It is also an effective way of getting digital skills into the workforce, not least by creating bridges in companies between young learners with a high degree of digital literacy and their senior colleagues and instructors.

Work-based learning and ongoing qualification of employees in many countries has kept pace with all the technical developments in recent decades. What is different today for training in the workplace is the speed of technological development. Speed is one of the central drivers of change in digitalisation and one of the main factors that sets it apart from previous technological development, automation and robotisation. It will also be a crucial success factor in reforming education and training in Europe – speed in investment and speed in creating training for the new jobs.

<1.3> PRIORITIES FOR REFORM – HOW TO MEET THE COMPETENCE DEMANDS OF A DIGITAL MANUFACTURING INDUSTRY?_

// GENERAL EDUCATION

- Policy makers need to ensure that Digital Media Literacy and STEM subjects are

prioritised in early childhood education, general education and higher education.

- In some countries in Europe, future changes in the digitalised society and their reflections on the citizens' competence needs have been recognised. Coding is considered an everyman skill and has been introduced in primary school curricula. Digital learning environments are developed. For a competitive European industry – across all of Europe – we need all Member States to integrate digital learning across all curricula. **The goal is not only to learn to utilize new equipment and programs, but to be able to understand and control their functioning and to create new ones.**
- Employers need to play a role in the design and development of courses, whether at school, college or university to ensure that the needs of our fast-moving industry are met. Only by considering the needs of the future now, manufacturers can prevent skills shortages from hampering their growth ambitions in the future.
- Work-based learning should be increased across all education. It is an effective means of bringing digital skills to the workforce and also an excellent way of preparing young people for the labour market.

// VOCATIONAL EDUCATION AND TRAINING (VET)

- In VET, IT skills and digital literacy should be taught through all professions and levels of education. This is also a responsibility for industry and social partners where they are involved in governance and curricula definition.

- There is no need for creation of completely new VET occupations – instead, the already existing occupations should be interlinked and adapted to the demands of digitalisation. It is therefore necessary to identify and develop additional qualifications and qualifying components that should be taught in VET. This is the task and strength of industry itself. Here work-based learning and continuous vocational training carried out in and by companies is vital to ensure that training systems are well prepared to respond to skills developments. This in itself requires education and training systems that are flexible enough to work together with industry as well as a shared understanding about the benefits of work-based learning.
- Making it possible to more freely combine studies from different VET programmes (e.g. mechanical engineering, automation technology, software engineering) and also courses from different educational levels, e.g. from VET education and practice-oriented higher education is essential to take into account the enhanced or new skills requirements. Therefore, introducing a learning outcome-based approach in VET is crucial.

// HIGHER EDUCATION

- Higher technical education will need to be developed to solve the high skill competence demands in industry that come with digitalisation. Engineering courses will need to put emphasis on fundamental engineering knowledge, such as ICT, but also focus on how this knowledge can be applied in real

systems and products, with an integration of project management skills, communications and business acumen.

- Both science universities and universities of applied sciences provide studies in analytics and cybersecurity, mainly for degree students. The competence base is improving in width and depth. However, the acute competence needs in the companies and in the public sector related to digitalisation would require focused investments in competence development for people at working age. A specialisation education and training model would, in principle, offer a structure to implement the education. It should be further improved to ensure flexible, extensive and high-level education and training in the rapidly changing environment.

// CONTINUING EDUCATION

- In terms of digital skills, intergenerational approaches (informal reverse mentoring) have started to emerge in the MET industries whereby mentors who are currently training engineering apprentices are learning digital skills from those apprentices. One of the advantages of recruiting younger apprentices is their digital knowledge and therefore it is seen by some companies as a good way of transferring knowledge to existing employees. This is a good practice model which can be rolled out across a variety of companies and sectors.
- Ever shorter innovation cycles reduce the “half-life” of knowledge, and therefore the importance of life-long learning is growing. This requires motivation and self-management on the part of

employees. Backed by appropriate support, their responsibility for their own employability must be strengthened, especially among less qualified people and job-seekers.

- Generally, the responsibility for ongoing vocational training should be shared as a function of benefits and interests. As a rule, employees and companies benefit equally from ongoing training. They should therefore both participate appropriately in the effort and accept responsibility. Above all, an investment in time constitutes a good possibility for the worker to contribute to the ongoing training effort.
- Further collaboration between governments and social partners is needed to ensure that individuals can invest the time, motivation and means to seek retraining opportunities.
- Policy makers can support companies who train by giving legal support for repayment clauses in further training agreements.
- In the case of qualifications that are not oriented towards operational needs, the focus must be on employee-funded models.



<2.0> WORK ORGANISATION_

HIGHLIGHTS://

- Work organisation primarily has to reflect what a company needs for production to stay competitive.
- New technologies can enable more autonomy in terms of time and space. Companies will therefore have to become more agile in managing work and workforce.
- The autonomy of the parties who conclude work and collective agreements on work flexibility must be respected by legislators.
- Policy makers must recognise that employer responsibility for achieving work-life balance objectives is limited.

To a large extent, the work models we see in the MET industries today have evolved out of work practices built for the industry of the past. In the immediate post-war period, economic activity meant production with a limited variation fixed in a limited number of places. However, technological change has upended this and traditional ways of deploying labour do not always fit with production needs and employee requests.

Work organisation primarily has to reflect what a company needs for production purposes to stay competitive and as produc-

Smart Industry and the Field lab 'Workplace Innovation'

FME, the Dutch employer organisation for the MET industry and a CEEMET member is one of the partners behind the 'Smart Industry' initiative in the Netherlands. Having developed an action plan for making industry more competitive through faster and better utilisation of the opportunities ICT has to offer, one of the main points is delivering on the setting up of field labs. Field labs are practical environments in which companies and knowledge institutions develop, test and implement effective Smart Industry solutions.

The most recent addition to the Smart Industry field labs is the **Field lab Workplace Innovation**.

The Field lab Workplace Innovation will change and innovate existing perceptions and behaviour concerning labour market issues in order to be fit for the future. It will start experiments and scale them up through the existing technology Field labs. Emphasis will be on (1) developing a learning culture in organisations, (2) modernising the relationship between employers and employees, (3) making lifelong learning possible, available and accessible for the individual employee – on demand, individual, any place, anywhere - by innovating the existing educational infrastructure (4), enhancing organisational learning in relation to team performance improvement and (5) implementation of flexibility models in regional labour markets.

Further information: www.smartindustry.nl



tion processes change due to digitalisation, the way we organise work needs to mirror this development. The term 'Smart Working' is used to refer to the new ways of working made possible by advances in technology and made essential by economic, environmental and social pressures.¹ In fact, these developments are not really 'new' per se, but have come about through a steady, albeit accelerating, evolution over decades in the way work is carried out.

Typical ongoing developments in MET industries driven by digitalisation include higher product variety, lower lot sizes, mass customisation, shorter product cycles, production on demand, changing capacity utilisation, growing market volatility, shorter delivery times and completely new processes. As a consequence, work organisation needs to adapt in terms of, for instance, working time and employment contract flexibility.

From an employee perspective, new technologies can enable more autonomy in terms of time and space, thereby changing how companies organise work. Some

categories of workers, including some on the shop floor, are to a lesser extent tied to their habitual work spaces and can be connected to their work at any time and from any location. The possibility to telework has, in every sense of the word, virtually exploded.

As physical and organisational boundaries progressively become more blurred, **organisations are going to have to become significantly more agile in the way they think about managing people's work and about the workforce as a whole.**

And it is not only companies that need to rethink their workforce management. The digitalisation of the world of work should be seen as an opportunity to further advance equal opportunities. Digitalisation can make work organisation more flexible, creating new opportunities for improving people's work-life balance. This can in particular enable women to enter the labour market in larger numbers and to make the most out of career opportunities – despite family obligations and in some cases an insufficient childcare infrastructure.

¹ Smart Working Handbook, 2015

Autonomy and flexibility are important factors in achieving a healthy work-life balance, but this also calls for an increased need for individuals to take more responsibility for setting boundaries, for balancing between requirements and resources, and for maintaining and strengthening their skills, competence and employability.

Overall, to support EU businesses' competitiveness in a digital economy, national and European working time and employment regulations must be sufficiently flexible. At the same time, social partner autonomy and the possibility to find tailor-made solutions that fit the local

context will become more and more important.

Policy makers must also respect the limits to which it can place responsibility on employers to achieve work-life balance objectives. In many cases, unnecessary regulatory intervention is likely to produce unintended consequences and impede the ability of companies to provide flexible working arrangements for their staff, create jobs and future prosperity.

Below, we take a closer look at how we need to rethink the concept of 'work' in a digitalised MET industry.

<2.1> FLEXIBLE WORKING HOURS_

Digitalisation can allow a greater degree of time autonomy in manufacturing and more potential for flexible working hours. For example, instead of 'linear' working, mutually agreed work interruptions become both possible and necessary in some fields.

The growing demand for more time flexibility is driven by both companies as well as employees.

These developments require an adjustment of the organisational framework as defined by law, collective agreements and works council agreements.

Attention should be paid to creating a balanced relationship between time autonomy and operational concerns. Such a balanced adjustment in everyone's interest will not be achieved by one-sided employee entitlements based on law or collective agreements.

The room for manoeuvre enjoyed by the parties who conclude work and collective agreements on flexible working hours must be respected by legislators.

A fair balance also means that any interference in companies' freedom to increase flexibility must be compensated. If demands are made for more time sovereignty for employees, then this will require adjustments concerning the responsibility for working hours (including obligations to keep records).

If the European Commission decides to revise the Working Time Directive, it is crucial to adapt current working time arrangements to the digital age.

- In a time of smartphones, telecommuting and the Internet of Things (IoT), a provision of a rigid 11-hour uninterrupted rest period for example is absolutely inadequate. It deprives

both employer and employee of the liberty to reconcile private life and work life more easily. With a rigid 11-hour rest period, the employee cannot take the afternoon off in order to take care of his/her children and answer emails via smartphone later that day without risking that he/she will not be allowed to go to work early enough the next morning.

- It is necessary to be able to distinguish between interruptions of rest periods

that are relevant to working hours and those that are not.

Areas of work that cannot be made more flexible must not be overlooked. In production departments, for example, deadlines, attendance at work and shift plans will also remain necessary in the future. These areas are essential for our business location and must not lose their importance because there are more opportunities for flexibility in other fields.

<2.2> FLEXIBLE WORKPLACES_

Digitalisation can be expected to increase flexibility in relation - not only - to production and thus working hours, but also to the workplace.

In general, mobile work equipment and opportunities to work more and more online reduce dependence on the hitherto rigid operational workplace and generate corresponding wishes among the employees. Workplace flexibility offers people a chance to improve their work-life balance and to advance equal opportunities in the process.

However, workplace flexibility is not possible everywhere and this is particularly

true for those sectors that produce heavy, bulky goods using heavy materials and machinery. Operational considerations must be taken into account here, too, as in the case of flexible working hours. There will be departments or operating units in which the staff will still have to be present on a permanent basis. But even in areas where mobile working is possible, a functioning sequence of operations must always be assured, and the workplace must be chosen accordingly, i.e. in a way that serves this purpose. To this extent, unilateral decisions by employees and one-sided entitlements for them are not useful in relation to the workplace.

<2.3> FLEXIBLE FORMS OF EMPLOYMENT AND DEFINITION OF 'EMPLOYEE'_

A flexible workforce is today one of the most important competitiveness factors for European industry. The exclusive use of full-time, open-ended contracts in MET

industries is the product of an earlier industrial age, where production and products were more standardised.

The changes to products and processes driven by technological development underscore the importance of evolving employment arrangements. While open-ended contracts continue to remain the norm in the MET industry, flexible forms of employment² allow employers a margin to deal with fluctuations in demand, providing for speedy and efficient deployment of rightly skilled workers for periods when orders diverge from 'normal'.

Current European legal frameworks on employment contracts remain fit for purpose. The criteria for distinguishing between work contracts and temporary employment are generally good.

Digitalisation opens up the field in recruitment and composition of the workforce. Cooperation between internal and external staff in mixed teams and the addition of highly qualified service providers for specific activities are already a reality today. Nonetheless, visions of global cooperation in virtual teams across borders and between companies raise questions about integration, leadership and supervision – in addition to the necessary adjustments in qualifications, working hours and the workplace. These issues need to be addressed.

² Forms of employment outside of full-time, open-ended contracts.

encourage customised agreements between the social partners.

The possible scope of the principle of general applicability "Erga Omnes" must definitely not be extended. Although general applicability increases the validity of a collective agreement, it weakens collective bargaining autonomy when the value of membership in employer associations is reduced.

In fields with generally applicable collective agreements, the added value of collective bargaining coverage for companies cannot lie in the applicability of the collective agreement.

General applicability cannot, therefore, achieve the objective (which is also sometimes pursued by policy-makers) of increasing collective bargaining coverage or the degree of organisation.

<2.4> COLLECTIVE BARGAINING

Industrial relations are characterised by many different models across Europe.

In several of those models, collective bargaining plays a prominent role in determining working conditions.

While digitalisation has put the spotlight on new forms of employment, the definition of 'employee', and the articulation of collective interests, solutions agreed by the social partners remain of central importance in shaping the world of work. In an increasingly digitalised and internationalised industry, the autonomy of collective bargaining must be strengthened, while respecting the principle of negative freedom of association. For this we need a common understanding of collective bargaining autonomy and mechanisms for strengthening collective bargaining coverage.

State intervention must be avoided and only be used when necessary, in order to

strengthen the parties to collective agreements in their function and to maintain social partnership in a changing world of work.

It is often the task of the collective bargaining parties to flexibly make the most of their room for manoeuvre. The substance of the compromises they reach must be accepted in order to also strengthen collective bargaining coverage on the employer side.

It can help if legal – including existing – regulations are equipped with 'opening clauses' to protect existing collective agreements or to allow and promote new ones.

Mere providing opportunities to deviate via collective agreements are not enough. Instead there should be clauses providing room for manoeuvre to create and to



<3.0> HEALTH AND SAFETY_

HIGHLIGHTS://

- Occupational Health and Safety (OSH) benefits of digitalisation should be promoted and not restricted by regulation from the outset.
- Workers are using the same technology in their private and professional life which blurs lines between workplace and private health and safety.
- Man-machine interaction, or coboting, is now common place. New ways are being found to deal with occupational health and safety implications.
- An ageing European workforce will benefit from the advent of new technologies, keeping them in work longer.

Digitalisation has undoubtedly made a positive contribution in the manufacturing industry in the area of occupational health and safety. With the help of digital technology, it has already become possible to perform and develop activities and tasks in a completely new way, leading to the disappearance of many heavy, monotone or hazardous job tasks.

New technologies continuously generate opportunities in the field of ergonomics

and thus in preventative healthcare. The increased use of assistance systems in manufacturing can relieve physical and mental stress; improve the level of employment for older workers and performance-impaired people. These are benefits for both employees and employers. This potential should be promoted and not restricted by regulations from the outset.

Schnaithmann Maschinenbau GmbH, Germany

"You could say that we have developed a navigation device for the workplace"

"Without the trusting cooperation with universities, institutes and industrial partners the complexity of industry 4.0 will not be manageable"

In a joint project with the University of Applied Science Esslingen and the sheltered workshop Heilbronn, the company Schnaithmann Maschinenbau GmbH created an assembly assistance system based on motion detection that leads employees through installation or order picking step by step. Since application



Further, a clear distinction must remain between binding statutory health and safety on the one hand, and voluntary workplace health promotion on the other. Only employers –and not legislators- can properly assess the usefulness of corresponding offers for their company and employees; workplace health promotion must therefore remain voluntary.



errors can therefore be virtually ruled out this means a significant increase in process safety and a big step towards zero error production. Even unskilled employees are enabled to high-quality assembly operations.

The developers integrated a motion sensor from consumer electronics in the assistance system. By combining it with a basic video projector and a PC a flexible system with minimal hardware requirements was designed. The use of a video projector allows all projection operations and thanks to the evaluation of the sensor's depth data movements as well as components can be detected. The assistance system can thus automatically detect a variant changes and react accordingly. New assembly

operations can be entered in the system without any programming knowledge in a very short time by the simple means of a correct process flow (Teach-In). The Time-of-Flight technology makes the system also independent from the lighting conditions.

The assistance system is capable to respond independently to changes in the environment and to express recommendations accordingly. In conjunction with other database and data transfer technologies, the system will support the employees in terms of ergonomics and can adjust to level of productivity of the individual employee. The use of "smart" component containers opens up unimagined possibilities for flexibility over the entire value chain.

<3.1> DIGITAL INDUSTRY – BLURRING BOUNDARIES BETWEEN PROFESSIONAL AND PRIVATE LIFE_

Digitalisation and occupational health and safety is an area where employers find it challenging to anticipate effects. As new

technologies become more and more advanced, their health and safety consequences become less and less certain.

The effects of digitalisation on health and safety are, in many cases, yet to be felt. We do not know the problems which will be encountered by workers who have to use these new technologies, for example head-mounted displays, on a daily basis.

The area is further complicated by the increasing overlap between what people do in their private life and in their work life. Most people use similar technology in their private life as they do in their professional life and this seems set to continue.

It is important that policy makers recognise that employers cannot be uniquely responsible for health and safety issues that may arise through using the technology that is used both in an individual's professional life as well as their private life.

Individual responsibility is key and a healthy work life must be a shared aim between employers and employees. Social dialogue can promote a common understanding of the importance of making a healthy work life a shared aim.

Policy makers must also be mindful of lifestyle factors outside the work environment which may have an impact on an individual's health at the workplace and over which employers have little control.

In general, research activities need to increase on occupational health and safety in the digital workplace. Research must not only be geared to dangers, but must also look at realising potential in maintaining or improving people's health and safety, employability and making companies more competitive. Furthermore, legislators must not lay down excessive requirements, e.g. with new or modified protection regimes.

health and safety issues have already been answered or are expected to be answered in the near future. Although this still remains an interesting field of research in the context of the 4th industrial revolution, taking a precautionary approach in dealing with this issue will only stifle the modernisation of European industry.

<3.3> TELEWORKING_

People have been able to work from home for many years. However, new and advanced technologies have started to make it possible to not only work from home, but to do all of your work from home. This does not just affect white collar, office workers; more and more technical operations can be done from a person's home. This raises some health and safety questions.

Issues of ergonomics and occupational health and safety are crucial when it comes to the use of mobile work equipment, ideas like 'bring your own device', and mobile working will be affected by this.

Employers are responsible for the implementation of workplace health and safety and the provision of the necessary means to employees to ensure their safety, how-

ever while teleworking it is the employee who must ensure their application. While teleworking, accidents must be reported in the same way as they would be at the workplace.

As in the case of flexible working hours and a flexible workplace, the employee's own responsibility must be strengthened here. Greater autonomy of employees when doing their jobs must also go hand in hand with more responsibility for their occupational health and safety. This applies above all if the work is not carried out at a regular workplace. The requirements of occupational health and safety at fixed, established workplaces cannot be transferred one-to-one to mobile workstations and home offices.



<3.2> MAN-MACHINE INTERACTION_

Man-machine interaction is nothing new, however it is now becoming commonplace and complex as these machines are less and less operating in cages, but are working in tandem with humans. Research into the occupational health and safety implications of this issue has been going on for many years, particularly in Germany. Thus, many questions related to workplace



<3.4> AGEING WORKFORCE_

Due to both demographic and medical developments, people are living and working longer. Automatisation has great potential to make work better for the ageing workforce. We must ensure that our workplaces are fit for purpose and able to deal with a greying workforce. Employers support the vision of a sustainable working life centring on facilitating people being

in work and remaining in employment longer. However, ensuring a sustainable working life is not only determined by OSH policies, but is also linked to public health issues.

This means further burden on employers which should not be overlooked by policy makers.



<4.0> DATA AND THE WORLD OF WORK_

HIGHLIGHTS://

- Data collection should be organised and controlled.
- Using data is necessary to improve production processes and is integral part of the 4th industrial revolution.
- At EU level the new General Data Protection Regulation (GDPR) provides a sufficient framework to reinforce data protection rights of individuals in the employment context.

Digitalisation increases both the amount of data that is collected and processed ('big data') and its quality ('smart data'). On the one hand, such large amounts of data must be organised and controlled; on the other, security aspects become more relevant. In this regard the recently adopted GDPR provides an extensive framework to "reinforce data protection rights of individuals in the employment context".

With respect to the processing of data in the employment context the Member States may, by law or by collective agreements, provide for more specific rules to ensure the protection of the rights and freedoms

in respect of the processing of employees' personal data in the employment context. As stated in Article 88 GDPR, these rules shall include suitable and specific measures to safeguard the data subject's human dignity, legitimate interests and fundamental rights. The future will show whether these rules are fit for purpose and the digitalised world of work.



- CEEMET represents the Metal, Engineering, Technology-based industry **employers** in Europe, covering sectors such as metal goods, mechanical engineering, electronics, ICT, vehicle and transport manufacturing.
- Our member organisations represent **200 000 companies** in Europe, providing over **35 million direct and indirect jobs**.
- As a recognised **European social partner**, CEEMET considers the impact of digitalisation on the world of work. CEEMET aims at contributing to make sure that the policy and legislative environment is flexible and future proof – also in the area of employment and social affairs.

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