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EDITORIAL

Time to rethink our future with courage and vision



This Magazine is about vision. For years now, CECIMO has been discussing the role of new technologies and innovation, which have been flowing along a blurred line between the physical and digital worlds. Their impact on the machine tool industry is significant and, given that machine tools are indispensable in any smart factory of the future, CECIMO decided to embrace this wind of change.

Machine tool companies have been establishing themselves for many years

as global frontrunners in advanced manufacturing. While metal-forming and cutting remain at the core, our industry has evolved and matured to include other related manufacturing technologies, such as Additive Manufacturing (or 3D printing), industrial automation systems, digital solutions and platforms, and ancillary products. In the end of last year CECIMO, decided to reflect all of this in a new description: CECIMO, European Association of the Machine Tool Industries and related Manufacturing Technologies. Our brand name – CECIMO – remains intact as it is synonymous with high standards in manufacturing, but we broadened our scope with the new description and a forward-looking vision for the future.

This Magazine is also about skills. We have decided to dedicate our Magazine on the future of work with a focus on the repercussions of industry 4.0 and artificial intelligence for the machine tool industry. It examines how we can better anticipate skills gaps and shortages and the role of industry, member states, European Commission and education and training bodies.

This Magazine is about the promise of a stronger EU. The new European Commission and the European Parliament have committed to promote our European interests and values on the global stage. We want to help the EU to deliver on its priorities.

Lastly, the Magazine will provide you with the latest news on standardisation, policy developments relevant to our industry, and updates on EU-funded projects. I want to spend a few words on one of them. Kraken is a project that started in 2016 and came to an end on September 2019. At the end of these three years, partners produced the largest multi-material hybrid manufacturing system, an excellent example of fast go to market of an innovative concept. The EU objective is simply to support such projects and that's why we hope that the next Multiannual Financial Framework 2021-2027 and Horizon Europe will finance manufacturing driven research and ultimately competitiveness.

We thank you for trusting our Magazine to be informed about the latest developments in advanced manufacturing in Europe and we promise to keep honouring your trust.

Filip Geerts

Director General

IN THIS MAGAZINE

CECIMO SPECIAL

How would you approach Al? - *page 4* Al: courageous capability upgrade required - *page 5*

New jobs by AI - page 6 Not only AI needs training, also humans - page 7

Industry 4.0 and skills - *page 8* The future of manufacturing - *page 10* Platforms of Centres of Vocational Excellence - *page 11* Aligning manufacturing-related education

& training with 21st Century needs - page 14

POLICY AND LEGISLATION

New European Commission - page 15 Strengthening European industry's competitiveness through a balanced regulatory framework - page 17 CECIMO's view on the review of the Machinery Directive - page 18 Mercosur: a trade opportunity for the European machine tool sector - page 19

Final workshop on the IPR study - page 20

Towards a functioning and innovationfriendly framework for the automotive sector - *page 21*

STANDARDISATION

umati: new dimension in networked production - page 23 The ISO Smart Manufacturing Coordinating Committee (SMCC) - page 24 Digitising EU Industry - page 25 The new ISO TR 22100-4 - page 26 Transition period for harmonised standards for presses - page 27

RESEARCH AND TECHNOLOGY

Kraken Project - page 28 SAM Project - page 29 Trinity Project - page 30 DIMOFAC Project - page 31

CECIMO NEWS

CECIMO contribution to the EU Industrial policy and the IPCEI - page 32 Industry4Europe Coalition and EU Industry Days - page 33 Brand new CECIMO website - page 34 Your insights on EMO Hannover 2019 page 35 The European Machine Tool industry today - page 36 MT for circular economy - page 38 Circular ambitions - page 40 CECIMO for additive manufacturing - page 41

INSIDE CECIMO

Meet a CECIMO Delegate - page 42 SST - page 43 European Exhibitions in 2020 - page 45



How would you approach AI?

An interview with Dr. Hans-Martin Schneeberger, Chairman of Schneeberger Holding AG and CECIMO Vice President

Artificial intelligence is not something new, machine learning has been around for a while. So why only recently industry and policy makers started talking about this technology? Machine learning has reached a stage where it can now be used to generate substantial commercial benefits. In addition, there are still a lot of activities and developments which will generate economic benefit several years down the road. So, there is substantial value today and a full pipeline of new possibilities in the years to come.

If we miss to mine the potential of this technology, we will very likely not only miss a fantastic opportunity but loose whatever competitive advantage we have today. This holds true for many or possibly all industries.

What is behind the explosive evolution in machine learning and what are the most important implications for machine tool companies?

Al and machine learning give us analytical tools to get insights into patterns and relationships of wide ranges of data and parameters, which we were not able to get until now. Machines equipped with relevant algorithm will outperform the machines we have today by potential doubledigit factors. It is like comparing manual operated milling machines from the early seventies with modern CNC Machining Centres.

As a Chairman of the board for Schneeberger Holding AG and CECIMO VP – tell us about the talent shortage in AI skills for the machine tool companies. Is the industry hurting for people with the right skills and why is it difficult to train AI professionals in house?

This is one of the most critical issues for many machine tool companies. Al is a completely new and different technology. Still today, in many companies, if the engineering and technology staff is faced with Al cracks, the engineering and technology experts believe that they are confronted with people from outer space speaking an altogether different language. This means that a) there is no way to develop and train anybody within your organization with your own resources b) how do you hire employees if there is no one inside your organisation who can judge if a potential candidate has any knowledge or is just hot air c) how do you look for external

partners to support you, if there is no one inside the company who can judge the knowledge and quality of a potential partner. This is extremely critical because companies like Google, Huawei, Amazon, Facebook, Microsoft and a few more are working on the forefront of the technology and hiring the most talented people and employ the best subcontractors. What is left is quite often what is left, and machine tools companies hire out of that pool without understanding that they get the bottom end. We find ourselves in a similar situation when we look for talents in universities. Top-end institutes are fully loaded with very lucrative work from the companies mentioned and it is very difficult to get attention and capacity for an SME. AI students at the top institutes get hired and leave before even finishing their degree with initial salaries exceeding the salaries of experienced engineers several times!

If you could do one thing right now, would you focus on structural adjustments; for example restructuring the economy to address job automation or investing into changes in the education and vocation training schemes? This I can answer very quickly. We need to put in place an education and training infrastructure to develop AI technicians, experts and professionals in quantities and not in homeopathic doses. I am convinced that in the future the need for AI educated staff will exceed today's demand of mechanical and electrical engineers combined. The countries, which will enjoy full employment with highly paid jobs and will lead the global productivity indices, are the ones which will be able to address industry demand for an AI educated workforce. Today China has the potential to outrun everybody.

Any last recommendations for CEOs of machine tool companies with regards to AI and skills? Every CEO has to find ways to build a strong AI team, regardless of all the difficulties mentioned. Get involved and understand what it is, what it means, how it works, what the opportunities are and also what the risk of missing out means.



Artificial Intelligence: Courageous Capability Upgrade Required

by Marc Ziegler, Partner, Porsche Consulting

The European machine tool industry has experienced impressive growth over the last decade. Most players of the industry are market leaders in their niche and valued globally for their product innovativeness, functionality, quality, and reliability. However, this success is not set in stone, as the sector is faced by an unprecedented technology-driven change. The Industrial Internet of Things, Electrification, and Artificial Intelligence (AI) are the most prominent and impactful drivers of this transition for the machine tool industry. And it is not the technology itself that requires change. Much more crucial are mind-set, culture, and, above all, new capabilities.

Let us focus here on artificial intelligence. Now more than ever, the interplay of various disciplines is required to harness Al's nearly infinite opportunities, which include predictive maintenance, automated guality controls, and augmentation of shop-floor workers. From data engineers building architecture around the data, to data scientists providing meaningful insights into data, to machine-learning (ML) engineers transforming the work of their colleagues into deployable solutions: all of these roles are new to machine tool companies, and related competencies are rarely found in-house. External hiring of new talents is mandatory but not enough. Even if machine tool companies can hire talents from outside, their useful integration is equally tough. Only a powerful alliance of AI specialists and in-house existing domain experts such as R&D engineers, machine operators, and IT systems engineers has the potential to leverage the promises of AI in manufacturing. This in turn requires a common language and skill upgrade of the existent workforce.

As the impact of AI spans across the organization—and AI will transform many different jobs—companies should first provide every employee with the knowledge they will need to understand and adapt to changing roles or tasks. Familiar measures such as all-hands meetings, intranet posts, short video clips, or presentations that explain the importance and value of AI to the company are often appropriate.

In parallel, machine tool companies should start to hire talents from the outside: one data scientist and one ML engineer is a reasonable starting point to build an anchor team that will work on first lighthouse use cases in collaboration with required domain experts of impacted departments. A collaboration with startups or AI technology vendors usually speeds up this initial stage of confidence-building, which is important to prove that AI provides value to the company.

The more Al becomes important to the company, the broader the training of the workforce involved in developing, implementing, and governing Al use cases is required. These trainings should reflect the different Al roles and skill levels. Together with appliedAl (footnote: Europe's largest initiative to accelerate the adoption of Al in enterprises, initiated by UnternehmerTUM) Porsche Consulting has developed a blended learning program with combined online and classroom trainings to educate the workforce on a larger scale.

With increasing experience, companies can also organize external events or leverage external communities. Kaggle, for example, is a well-known competition platform that enables companies to host interesting data challenges tackled by the international data science community. The best solution is awarded a cash reward. Companies have the opportunity to generate solutions as well as attract talents.

All these capability-upgrade activities are no guarantee for success. They should come hand in hand with appropriate Al implementation structures (e.g., competence center, product teams, and the like) and a holistic change management program—based on 100 percent top management commitment.

The AI journey ahead is a challenge but, I am convinced, a rewarding one.



Machine tool companies, which consider the option of building their own AI solutions, will need to reflect on whether they have the capacity to attract and retain Artificial Intelligence talent and therefore be able to integrate these technologies in their manufacturing processes.

Dr. Roland FEICHTL CECIMO President and Member of the KRAUSECO Supervisory Board



New jobs by Al

by Thomas Schneider, Managing Director Research + Development, TRUMPF Machine Tools

Artificial Intelligence is a big chance for European machine tool companies. It leads to technology advantages and better competitive positions. We should lay the track for an intelligent production in the connected future now – before others do.



Digitization is one of the most important future issues for industrial production. This includes artificial intelligence, or AI for short. It helps us to tackle abstractly formulated tasks. The advantage is that it works independently without us having to program each individual step. It easily identifies patterns in data and processes that we would have struggled to detect or even over–looked completely in the past. In future, AI will ensure that complex technical systems remain manageable. All this will ultimately make manufacturing more efficient and improve our solutions and prod¬ucts, ensuring that we keep our competitive edge.

We are therefore researching and working with artificial intelligence in several fields at TRUMPF. We also have representatives in all the key associations, organizations and commit¬tees that deal with this topic. Working with partners is absolutely essential: only through collaborative efforts and projects we can develop the uniform standards and open platforms that will lay the foundations for widespread deployment of AI.

Al as next step in a connected production

Digital solutions are already established to minimize downtime or even eliminate it altogether. For example, a machine can call attention to itself by sending a message to a technician's smartphone if it stops working. This can be made even more efficient by getting machines to notify the technician before the problem even arises. Many machines from TRUMPF can already do this by using statistical data to announce when a component may fail, including an estimate of how likely it is to happen. That enables workers to order and replace the component in good time. The future brings even more. We are devel¬oping an Al solution that will give service technicians suggestions on what repairs they need to make.

The Change means a chance

The chance of AI and the change in the future is obvious. The deployment of AI opens up new fields of activity in areas such as sensor systems and testing. We have to select and prepare the right data before AI can use it, so humans still have an indispensable role to play in making AI work. In future, our jobs are likely to shift toward planning and supporting processes and interpreting the re¬sults. AI will release us from some of the more physically demanding and monotonous routine tasks. An example of this is the mechanical removal of parts from sheet metal by the fullservice laser machine with the aid of AI.

However, the use of artificial intelligence without human involvement is inconceivable. AI means that new job profiles will be created, particularly in highly qualified fields. The shift to more AI in our production will open up new opportunities for people that gain further qualifications and stay curious. In a healthy company, the number of employees is more likely to increase through the use of artificial intelligence because it results in competitive advantages for the company.



Not only AI needs training, also humans - to deal properly with AI

by Plamen Kiradjiev, Global CTO Industrie 4.0, IBM

One of the key characteristics of Artificial Intelligence applications is the way it is created - not by coding, but by training. Herewith, application logic is generated by a "magic" black box (learning algorithms) after feeding the data through. For the successful implementation within a company, AI needs two things: first, a collaborative analytics platform, enabling integration of various data sources (opposed to moving around tons of data), secure access to different data refinery, visualization and analysis tools as well as streamlined creation, training and deployment of AI models. Second, an open platform to implement data feeds and put in place the created AI models in an automated way by using continuous delivery pipelines. Technologies like Python, R, Jupyter Notebooks, Docker, Kubernetes, etc. bundled in platforms, like IBM's Data & AI Platform, IBM Cloud Private, RedHat OpenShift and others, provide substantial support for streamlining AI processes in a scalable way wherever they are, on-premise or on any Cloud.

Similarly to raising a child, trainers, like parents and teachers, could do their job well or bad and get a different result for the final product. Even if Al lowers the technical barriers for creating applications, two aspects play an important role here: skills (for training Al rather than programming) and ethics.

The special importance of ethics comes, more and more, from the democratization of AI applications. Ethics in AI has been addressed by the industry, like the broad Partnership on AI and IBM's AI Guiding Principles for Trust and Transparency, as well as by politics, like the German Bundestag Enquete Commission. Besides establishing a code of conduct, any product, process or strategic decision supported by AI requires measurable transparency and "explainability" of the algorithms in terms of bias, performance, accuracy, etc., ideally supported by tools like Watson OpenScale and AI Fairness 360.

Building AI skills to use technologies like the ones mentioned above is fundamental in manufacturing to fully deploy digitization, also known as Industrie 4.0. As part of EU 2030 High Tech Skills Vision, several representatives from academy, industry and politics have developed recommendations.

Key takeaways from the 9 operationalization modules are:

1. Establishing a long-term knowledge and

skills strategy by visionary leadership, a clear governance structure with clear and measurable objectives, that is forward looking, based on data and facts, and has dedicated upskilling funding at all levels.

- 2. Developing world-class curriculum with focus on industry and market requirements by leveraging successful vocational education and training practices.
- 3. Creating a positive and open skill development culture by all means of communication, incentives and talent detection, and nurturing activities.

As one of the key contributors in the EU 2030 High Tech Skills strategy workshops, IBM has been demonstrating and further developing this vital aspect of its own business and technology in all dimensions: for its internal talent community, for its client and partner business as well as in its engagement in society, research and education. A good example of strategy execution in the area of AI skill development is IBM's internal AI Academy. Every month several thousand IBMers complete their qualification in professions like AI Business Consultant, AI Data Scientist, AI Data Engineer, AI Software Architect, Al Seller, etc. Together with the ubiquity and accessibility of online education, coaches and mentors, the internal upskilling activities are motivated by a positive leadership attitude to education at every level, earning of OpenBadges for the professional career as well as key part of each personal development yearly goals. External IBM activities in this area are the up-/re-skilling New Collar program as well as the active sponsorship of P-TECH activities at schools in grades 9 to 14 for bridging the STEM skill gaps. Prominent examples of cooperation between education, research and industry, are public-private partnerships with IBM sponsorship, like the MIT-IBM Watson AI Lab and UofSC Digital Transformation Lab in the USA, Smart Data Innovation Lab and SmartFactoryKL in Germany. Finally, free IBM technology accessibility, e.g. via the IBM Academic Initiative and IBM Q Experience, provides opportunity for immediate practice.

Often, data is explicitly emphasized as the oil of the 21st century. Nevertheless, in all high tech and Al aspects, the role of the human, our skills in a broad meaning, i.e. including empathy and ethics, and our readiness to further develop them are playing a crucial role for our business, for our progress for a better and smarter world we all want to live in.



Industry 4.0 and skills

by Barbara Colombo, Vice President of Ficep SpA and UCIMU Vice President

As everyone knows, Industry 4.0. is related to the so-called fourth industrial revolution, enabled by the availability of low-cost sensors and wireless connections. This new industrial revolution is combined with a more and more pervasive use of data, information, computational and data-analysis technologies, new materials and components and totally digitalized and connected systems (internet of things and machines).

In Ficep, "Industry 4.0" is at the heart of our development strategy. So, how do we face this change?

We started from a deep understanding of a Steel Fabrication Factory (our customer) and of its productive process. The result was the creation of an Intelligent Steel Fabrication Software, a PLM (Product Lifecycle Management). The PLM created a link between detailing technical office and the workshop in order to offer a digitalized management of the workflow and optimize production (with a clearly visible ROI and with cost savings). 3D projects are now easily imported into our software allowing recognition of assemblies and pieces, as well as all the operations (fabrication jobs) to be carried out on our CNC machines. Feedbacks from CNC machines can be automatically collected in real time to track production, even to 3D model. One single XML file contains all data we need for fabrication management, and our post-processors drive machines by translating programs sent from the office (XML file). These data help to react in an intelligent way to optimize the industrial process, allowing planners and supervisors to understand how their processes are performing because they can easily see bottlenecks and inefficiencies which were previously hidden, adjusting workflow accordingly.

Thanks to large investments on "Industry 4.0", Ficep is now recognized worldwide as a supplier of turnkey advanced factories more than a machine tool company for structural steel fabrication. We supply automation, intelligent steel fabrication, mobile applications, software integration, production management and analysis.

To reach this goal, Ficep exploited our most valuable assets: our knowledge, skills and creativity. People were the heart of this revolution. A new software department counting 45 electronic engineers was created to design, manage and maintain PLM, HMI (Human Manufacturing Interface) and CNC software. For this purpose, Ficep created a specific Academy for the continuous training of Ficep staff and customers' personnel, so they could to get a wider knowledge of the overall process in steel fabrication. The academy provides training for CNC and PLM development, automation, processing technology theories, tests and predictive maintenance for a total amount of 5000 hours per year.

Italian companies operating in our sector have difficulties though in finding personnel. The number of open jobs exceeds the number of skilled people looking for a job. Even if educational bodies and manufacturing companies communicate more than ever before, we face 2 different problems. The first one is quantitative: lack of students enrolling in technical schools, as there is still a negative perception of students and their parents toward the manufacturing industry. The second one is qualitative: enterprises require new skills both to young people entering the labour market and to those who already work in factories. Such a gap is paradoxical in Italy, given that the unemployment rate among young people is high.

Among the professional profiles harder to find, there are: field engineers, such as for example, technicians in charge of programming CNC machines and robots; electromechanical technicians, such as installers, maintenance technicians of machines and systems, and skilled production workers specialized in machining and welding.

In this industrial transformation, tasks are changing and also the required skills. Programming, for example, is no longer linked to a single machine, but it involves or may involve an entire process. It no longer entails only electronic, but also IT languages. Process supervision of the automatic processing can be carried out by every technician in real time thanks to a mobile device, an iPad or a smart watch, which can monitor machines, processes, time and performances. The technician has then to be able to report eventual inefficiencies to a higher level, that is the production planning office. Maintenance, instead of being a corrective, replacement action, today changed into a predictive intervention, based on the definition of algorithms and on monitoring data collected by the machine. This activity may be carried out on more machines and systems at the same time and even remotely. In our case, I wouldn't say that the rise of automation and artificial intelligence is stealing traditional jobs,

but it's changing the way of doing things for traditional jobs.

Besides the traditional roles related to production, which are not going to disappear but will change over time, new roles are emerging. The first most relevant one is the operational technology manager, in charge of the digital technology in a factory, who has to understand how to integrate activities and functions of single machines and their monitoring. There is also a growing demand for analytics developers and data scientists, all of them reporting to the operational technology manager, while monitoring and analysing data. Changes also concern "indirect" tasks and roles in production. There is a growing need to organise companies with employees dedicated to legal, insurance and security activities.

Over the last few years, we have seen interesting prospects of employment for young people, but it is necessary that professional education and training are up-to-date and suit the needs of enterprises.

Technical institutes – in the mechanical, mechatronic, electrotechnical and IT domains – may represent excellent solutions for those who wish an interesting and well-paid job. For those who wish to continue their studies after High School or technical schools without going to university, there are ITS, advanced technical education schools, which offer two-years courses equally distributed between education in a classroom and training in a factory. According to the official data (end of 2017), eight ITS graduates out of ten find a job immediately after their diploma. The same data apply to students who got their degree in technical schools (ISIS). In most cases, students are already booked by companies when they are at their third or fourth year of study.

The industrial transformation brought about by Industry 4.0 represents an opportunity for school institutes to keep up with these changing times and create laboratories (like Idea.lab of Gallarate), which can train students both on traditional mechanics/electronics and on competences 4.0. Enterprises will also be able to play an essential role by investing private resources to create school environments tailored to the new requirements of the market. Industry 4.0 and its related transformations will allow to debunk some old belief in mechanical factories and the scarcely qualified work of their workers.





The future of Manufacturing: skills and technology

by Andrew Hodgson, Strategic Sales Lead – Digitalisation, Siemens

The future is 'digital' - so we are told. We bank online, we shop online and our entertainment is from the cloud. But what does it means for industry, specifically manufacturing?

The functionality offered by 'digitalisation' is not new. The automotive industry has perfected the 'batch size of one' in a mass production facility. In aerospace the world of 3D modelling and simulation is well established. The product is high value and therefore the software is expensive and the people who use it have high salaries. In machine tool terms much of the functionality described as 'Industry 4.0' or digitalisation has been available for many years.

So, what has changed?

Technology has democratised this functionality and has opened doors to mid and low value production. Smart robotics, cloud and artificial intelligence (AI) have enabled industries from food & beverage to chemicals and pharmaceuticals to develop new products and services. The benefits of simulation and virtual design (the digital twin) previously accessible only to aerospace and Formula 1 can now be applied to a building, a machine or even a chocolate bar. Let's not forget fluid and material simulation. Discreet objects are relatively simple compared with the seemingly random behaviour of water, oil and even sand - AI can evaluate multiple data sources and predict how these materials will flow offering the user predictable outcomes.

Therefore, if the technology and the benefits are known what are the challenges then?

As previously said, prime and blue-chip manufacturers have already understood and heavily invested in the benefits of digitalisation but what about the supply chains and the SMEs? If the business case is straightforward and the ROI obvious, then this technology would be ubiquitous.

SMEs and the Mittelstand are made up of a wide range of small companies - from family owned to technology start-ups all with a special service or product – but they are almost always cautious and wary. They need to be sure that their investment is sound. A bad investment could be as disastrous as no investment! In the UK these barriers were explored and the 'Made Smarter' initiative was submitted to the UK government to address and answer these challenges. Made Smarter offered 3 tenets: innovation, adoption and leadership - these having equal importance.

Innovation in the application of the technology, adoption addressing the challenges and leadership to enable businesses to grasp the benefits.

In all 3 tenets education and skills are required to maximise the impact. Not just the technical skills to apply the technology but also the soft skills. A robot line managed by AI may be the solution to bridge the productivity gap in part of a manufacturing facility but resistance within the existing workforce may be the real barrier. Understanding that jobs will disappear but other will be created is the message, together with realising that 'no change' is a slippery slope to oblivion and that people are the key. If a job is dull, dirty or dangerous, then companies should apply automation. Monotonous data analysis is done better, faster and cheaper by Al. Human beings are creative and innovative so release this asset. These new, to some, skills must be nurtured. The appropriate skills must be taught in schools and colleges - linked to industry so that they are applicable. But the existing workforce needs knowledge, which is the key to ensure that new technology assists their businesses and not starting afresh. Re-training and above all life-long training must be the norm.

A cultural revolution is required. The brave new world offered by the technologies of the 4th Industrial (ev)Revolution should be embraced not ignored or rejected. The future is here for the young and old, the professional and the manual worker – everyone may need to think different.



Platforms of Centres of Vocational Excellence

Fostering "Skills ecosystems" for innovation, regional development, and smart specialisation

by João Santos, Deputy Head of Unit, Directorate General for Employment, Social Affairs, and Inclusion, European Commission

UNDERSTANDING CHANGE - We live in interesting times

The combined effects of rapid technological change, digitalization, climate change, circular economy, and new forms of work, call for innovative ideas to ensure that Vocational training not only adapts to change, but is also at the forefront of mastering and driving this change. These developments are not only disrupting every aspect of work and life, but also creating opportunities for innovation and employment creation across all sectors. The capacity to innovate is increasingly becoming the key factor driving economic and social development.

VET policy makers are confronted with new challenges in anticipating and responding in due time to the fast changing skill needs of the labour market, and to the expectations of individuals. The "shelf-life" of skills is becoming increasingly short. To address this challenge, VET institutions must become much more flexible and responsive to the need for renewing their offer, companies have to become an active partner in designing and providing opportunities for work-based learning, and individuals have to embrace lifelong learning to maintain their employability, active citizenship and quality of life. The way we teach and learn has to be in tune with these new opportunities and challenges.

Developments in the VET system have been mainly of a gradual and incremental nature, and in most cases driven top-down. Businessas-usual may not be a viable option for the future. The speed and scale of change calls for innovative approaches where VET institutions are empowered to understand, engage and be an active partner in co-creating solutions for local social and economic development. A bottom-up approach where VET institutions are capable of rapidly adapting skills provision to evolving local needs, is essential to raise the attractiveness, relevance and guality in VET. The new paradigm for VET institutions is local in its nature, while the challenges they are facing is increasingly complex and global.

WHAT IS VOCATIONAL EXCELLENCE – empowering people with skills for life

VET Excellence ensures high quality skills and competences that lead to quality employment and career-long opportunities, which meet the needs of an innovative, inclusive and sustainable economy.

The concept of vocational excellence that is proposed is characterised by a **holistic learner centred** approach in which VET:

- Is an integrative part of skills ecosystems, contributing to regional development ¹, innovation², and smart specialisation strategies³
- 2. Is part of **knowledge triangles**, working closely with other education and training sectors, the scientific community, and business
- 3. Enables learners to acquire both **vocational** and **key competences**⁴ through **highquality provision** that is underpinned by quality assurance, builds innovative forms of partnerships with the world of work, and is supported by the continuous professional development of teaching and training staff, innovative pedagogies, mobility and internationalisation strategies.

THE INITIATIVE ON PLATFORMS OF "CENTRES OF VOCATIONAL EXCELLENCE" - Think global, act local

When discussing innovation, reference is often made to the "**knowledge triangle**" – a *link between businesses, education and research*. In this context, education is often understood as academic higher education, with VET playing a marginal role, and quite often being neglected. However, VET has an important role to play in the "knowledge triangle", as well as in "smart specialisation" strategies that lead to sustainable growth, innovation, job creation and social cohesion.

Some Member States have launched successful initiatives aiming at Vocational excellence, and include VET as part of their innovation strategies. However, these are still rare exceptions, and progress has been uneven throughout Europe.

At a European cooperation level, we are missing an initiative that brings a holistic approach to vocational excellence. Instead, specific priorities and actions have been put in place, such as the European Alliance for Apprenticeships, the Pact for Youth, the strong support for VET mobility, as well as the development of tools for quality assurance and credit systems in VET. All these



actions certainly contribute to increase the quality and excellence in VET, but in isolation they do not constitute a comprehensive approach to Vocational Excellence.

This initiative responds to this challenge, and introduces a "**European dimension**" to Vocational Excellence by supporting the development of **Centres of Vocational Excellence**, operating at two levels:

- National: in a given local context, embedding
 Centres of Vocational Excellence closely in the
 local innovation ecosystems, and connecting
 them at European level
- Transnational: through Platforms of Centres of Vocational Excellence to establish worldclass reference points for vocational training by bringing together CoVE's that **share a** common interest in specific sectors⁵/ trades (e.g. aeronautics, e-mobility, green technologies, ICT, healthcare, etc.) or innovative approaches to tackle societal challenges (e.g. integration of migrants, Digitalisation, Artificial Intelligence Sustainable Development Goals, upskilling people with low qualification levels, etc.)⁶.

The **platforms** will either bring together existing CoVE's in different countries, or expand the model by linking well-established CoVE's in one country with partners in other countries, that intend to develop CoVE's in their local eco-system.

The transnational collaborative platforms, aim for "**upward convergence**" of excellence in VET, which would be difficult to establish in isolation in the absence of EU incentives, technical support, and mutual learning opportunities. The platforms will be open for the involvement of countries with well-developed vocational excellence systems, as well as those in the process of developing similar approaches, aimed at exploring the full potential of VET institutions to play a proactive role in support of growth, competitiveness and innovation.

Platforms of Centres of Vocational excellence **are not intended to build new VET institutions** and infrastructure from scratch (although it may also require this type of investment). Instead they aim to bring together a set of local/regional partners such as Initial and continuing VET providers, tertiary education institutions including universities of applied sciences and polytechnics, research institutions, science parks, companies, chambers and their associations, social partners, sectoral skills councils, Professional/sector associations, national and regional authorities and development agencies, public employment services, etc.

THE ESSENTIAL FEATURES OF CENTRES OF VOCATIONAL EXCELLENCE – We raise by lifting others

CoVE's are characterised by adopting a **systemic approach** through which VET institutions actively contribute to co-create "**skills ecosystems**", together with a wide range of other local/regional partners. CoVE's are expected to go far beyond the simple provision of a quality vocational qualification.

- A recent mapping exercise of some of the most effective existing CoVE's in Europe, showed that Anchored into frameworks of regional development, innovation and smart specialisation - allows for the identification of synergies between policies and amongst stakeholders, avoiding ad-hoc actions
- Strong and enduring partnerships between the VET community, businesses and universities in which interactions are reciprocal and mutually beneficial
- Integration of activities CoVEs achieve more than sum of the parts

Features that characterise the CoVE's include a set of some of activities and services that can be broadly grouped under the following 3 clusters:

- 1. Teaching and learning,
- 2. Cooperation and partnerships, and
- 3. Governance and funding.

The CoVE's could build synergies with other relevant EU initiatives, such as the Blueprint for sectoral skills and Sector skills alliances that work on related activities such as understanding future skill needs and occupational profiles and translating them to qualification profiles.

EU SUPPORT FOR THE PLATFORMS OF COVE'S – Upward convergence of VET excellence

The full implementation of the initiative requires resources that are currently not available. Therefore, on 30 May 2018, the Commission adopted its proposal for the next Erasmus programme 2021-2027, which under the title "Partnerships for Excellence", includes funding for Centres of vocational excellence.

In the future programming period 2021-2027 Erasmus funding, could (where appropriate) be complemented by other EU funds for investments into research and infrastructure, for instance applied research projects, IT technology, machinery, robots, investments in premises or other tangible assets, such as building up of business incubators.

Actions to prepare the initiative are already taking place. In the short term (2019-2020) the initiative can be piloted through support from the current Erasmus+ programme:

- In the 2019 Erasmus+ Work Programme, the Commission launched a limited pilot project under Sector Skills Alliances (SSA) with a budget of €6 million to support a first set of up to 6 projects running for 2 years. These still had a restricted focus on sectoral skills approaches.
- In the 2020 Erasmus+ Work Programme, the Commission will propose a specific call for a second set of pilot projects to establish Platforms of CoVE's with a budget of €20 million to support 5 projects that closely resemble the future model that will be supported in the next Erasmus programme. The design of this call will incorporate some key elements identified from the 2019 pilot project proposals.

The Evaluation Committee, has concluded the analysis of the 2019 pilot project applications. The results are very encouraging with high demand for the initiative. Although this first pilot had limited resources to finance a maximum of 6 projects, we received 15 applications with a budget demand of over €13 million. The projects included partners from all EU countries, except HU and LU, and also from one candidate country. Up to 177 organizations were involved in these applications, with an average of 12 partners per project. Partners were mostly VET centres (both upper secondary, as well as tertiary level Universities of applied sciences), Centres for adult training, regional development agencies, SMEs, Chambers and Social partners.

On 25 July 2019, EACEA published the results of the first Erasmus+ call. The first 5 CoVE pilot projects selected are:

- 1. Digital innovation Hub for Cloud Based Services, led by Helsinki Business College, in Finland
- 2. European Open Design School for Sustainable Regional Development, led by Fondazione Matera-Basilicata 2019, in Italy
- 3. Excellent advanced manufacturing 4.0, led by TKNIKA, in Spain
- 4. Pilot Platform of Vocational Excellence Water, led by Freisland College, in The Netherlands
- 5. Talentjourney Platform for CDS VET Excellence, led by Solski center Nova Gorica, in Slovenia

CONCLUDING REMARKS – Be the change you want to see

I would like to conclude by challenging CECIMO to capitalise on its experience of running successful Erasmus projects, and be part of this paradigm shift we want to support through the initiative on Centres of Vocational Excellence.

CECIMO is in a unique position to support the European Machine Tool Industries and related Manufacturing Technologies, in ensuring the provision of the current and future skills, that they need to innovate, and increase their competitiveness and growth.

Building on its extensive network of National Associations of machine tool builders, which represent approximately 1300 industrial enterprises in Europe covering 98% of total Machine Tool production in Europe and about 36% worldwide, I would like to invite CECIMO and its members to closely analyse the next Erasmus call that we expect to publish in October 2019, and bring together the right partners willing to apply for EU support to establish a successful Platform of Vocational Excellence for your sector.

Notes

1. Regional Development Policy - Regional development is a broad term but can be seen as a general effort to reduce regional disparities by supporting (employment and wealth-generating) economic activities in regions. See http://www.oecd.org/cfe/regional-policy/regionaldevelopment.htm

2. An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. See https://stats.oecd.org/glossary/detail.asp?ID=6865

3. Smart Specialisation is a place-based approach characterised by the identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an Entrepreneurial Discovery Process with wide stakeholder involvement. It is outwardlooking and embraces a broad view of innovation including but certainly not limited to technology-driven approaches, supported by effective monitoring mechanisms. See http://s3platform.jrc.ec.europa.eu/what-issmart-specialisation-

4. As defined in the Council Recommendation of 22 May 2018 on key competences for lifelong learning. See https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&from=EN

5. For example those identified as being part of the "key strategic value chains", within the discussion of the Strategic Forum for Important projects of common European interest (IPCEI)

6. The smart specialisation platforms (S3) also have thematic Platforms for Industrial Modernisation, in sectors such as Agri-food, Energy and Blue Growth, which include transnational partnerships in specific priorities within these areas that are shared by regions (see http://s3platform.jrc. ec.europa.eu/s3-thematic-platforms)



Aligning Manufacturing-Related Education & Training with the 21st Century Needs

by Dr. Kristina Dervojeda, PwC

The manufacturing domain is undergoing a profound transformation, causing direct implications for the skill needs. The so called 4.0 skills implying a multidisciplinary mix of technical and non-technical capabilities signify a need to reconsider the current approaches towards the education and training of manufacturing professionals.

The main objective is to create an educational culture and learning environment that would lead to the development of highly skilled, flexible, emotionally and socially intelligent manufacturing professionals. The main emphasis still needs to be put on the technical skills forming the core of this profession. Those include, for example, the ability to interact with human-machine interfaces, data management skills, and specialised and interdisciplinary knowledge of technologies and processes. However, rapidly advancing technology requires a general mind-set for continuous improvement and lifelong learning. It is no longer just about what one knows, but increasingly about one's ability to adapt to continuously changing circumstances and to constantly advance one's knowledge and skills. Focussing on technical skills only is thus not enough. Other crucial non-technical skills refer to critical thinking, creativity, communication skills and ability to work in teams.

How do we create an education & training environment that would produce the abovementioned outcome? This highly complex question can hardly be answered with a 'one size fits all' solution. There are multiple examples of education & training providers from all over Europe that successfully apply different approaches and experiment with various models. What can we learn from them?

The following eighth conceptual curriculum design principles can be extracted:

- Student-centred approach, putting learners at the centre of the curriculum design, in order to cultivate their intrinsic motivation; it includes engaging learners in designing their learning programmes and in assessing their own progress and experience;
- Multidisciplinary orientation, implying both technical multidisciplinarity and the enhancement of technical curricula with the elements that stimulate, among others, analytical and critical thinking, creativity, entrepreneurship, social and ethical perspectives for science and technology;
- Problem-driven learning, stimulating students to work on challenging real-life problems for which there are no established answers; this approach allows students to





contextualise their theoretical learning in relation to how it would be useful in the world around them;

- Collaborative learning, encouraging peerto-peer learning, collaborative working in multidisciplinary teams, and fostering the development of communication skills;
- **Technology-enabled learning**, encouraging the use of technology and software applications for learning such as Massive Open Online Courses (MOOCs), mlearning, gamification, Augmented and Virtual Reality, Artificial Intelligence etc.;
- Experience-based learning, facilitating the acquisition of hands-on experience, developing projects around real-life cases and stimulating the acquisition of hands-on experience, engaging companies in providing cases and facilities, acquiring real work experience while studying;
- Continuous learning, recognising that formal education is only part of the lifelong learning trajectory, encouraging the use of informal types of learning including opensource learning and extra-curricular activities, providing students with skills and tools to continue their own upskilling throughout their career;
- Learning ecosystem approach, connecting learners to each other, employers and society through, among others, technology-enabled

platforms, project work, industrial placements and matchmaking events.

These principles are complimentary, and thus can (and need to) be combined. Replication of good practices, however, should always be done in a tailored way, keeping in mind the contextual specifics. When developing a tailored curriculum, there is a need to follow a holistic approach covering a broad spectrum of dimensions relevant to curriculum design and implementation. The eight main dimensions that need to be addressed include strategy, collaboration, content, learning environment, delivery mechanisms, assessment, recognition and quality.

These and related questions are currently analysed by PwC in the context of the "Curriculum Guidelines for Key Enabling Technologies (KETs) and Advanced Manufacturing Technologies (AMT)" initiative for the Executive Agency for Small and Medium-sized Enterprises and the Directorate General for Internal Market, Industry, Entrepreneurship and SMEs of the European Commission. This initiative (2018 - 2019) aims to contribute to increasing the quality and relevance of existing curricula and to promote better cooperation between industry and education & training organisations in the manufacturing domain. The outcome of this initiative will play a prominent role in forming the EU policy making regarding upskilling of the manufacturing workforce. More information can be found in the Interim Report available on EU Publications.

WHAT TO EXPECT FROM

THE FIRST IOO DAYS OF THE NEW EUROPEAN COMMISSION

SNAPSHOT OF PROPOSALS AND INITIATIVES

EUROPEAN GREEN DEAL



- EC aims to increase the 2030 emission reduction target to at least 50% by 2030, up from the 40% currently agreed.
- EC to lead international negotiations to increase the level of ambition of other major emitters by 2021 and put forward a comprehensive plan to increase the EU's target for 2030 towards 55% in a responsible way.
- EC to propose a new Just Transition Fund to support the affected from the climate commitments in industrial, coal and energy intensive regions.
- · EC to promote a zero-pollution ambition looking at air, water,
- and noise pollution from transport, agriculture and food production, water quality, hazardous chemicals and other key areas.
- The EC will work on the Carbon Border Tax and the review of the Energy Taxation Directive.

EUROPEAN CLIMATE LAW

EC to propose a European Climate Law to transform the 2050 climateneutrality target into legislation..





EUROPEAN APPROACH ON ARTIFICIAL INTELLIGENCE

- EC to propose a European approach on AI including its human and ethical implications.
- The EC will look at how we can use and share non-personalised big data to develop new technologies and business models.



We are pleased to see that the French Commissioner will be the one responsible for the portfolio of internal market. Europe's industry is a driver for jobs and growth. We ask the Commissioner to ensure that industry remains globally competitive and makes the most of the digital transition. Therefore, it is essential that the new SME strategy supports businesses and reduces regulatory burden.

Olivier DARIO General Manager of SYMOP

16 cecimo magazine | Fall 2019



Strengthening European industry's competitiveness through a balanced regulatory framework

by Barbara Bonvissuto, Head of Unit, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, European Commission

Manufacturing industry is the backbone of European economy and a strong player on the global market place. On the positive trade balance, our companies' market leadership is challenged by factors such as industrial transformation or protectionist policies. In this environment, we need to safeguard the competitiveness of our industry. A legal framework that is conducive to innovation and that provides at the same time a high level of safety for consumers and users, as well as environmental protection, is one of the key instruments to support competitiveness.

With respect to the digital revolution, let me first underline that the EU has a robust regulatory framework for products that has the capacity to serve the challenges of tomorrow. It formulates mandatory essential health and safety requirements while technical details are left to manufacturers. This technique has proven to strike the right balance between safety and innovation, and its relevance increases in a fast-moving digital market.

Having said this, we need to ensure that new risks stemming from emerging digital technologies such as artificial intelligence, the internet of things or robotics, are adequately covered and that the level playing field for European companies is ensured.

The Commission is currently working on improving the safety legislation for electromechanical engineering sectors while beating the drums this year for three decades of Machinery Directive, a centrepiece of EU internal market legislation for robotics and machine tools industries. Stakeholders have already indicated a wide support for a revision of the Machinery Directive, through their feedback on the Inception Impact Assessment.

This revision builds on the outcomes of the Directive's evaluation, published by the Commission last year in May. While the evaluation pointed to the Directive's positive contribution to the free movement of machinery within the EU and a high level of safety for consumers and users, it has also identified areas of improvement and simplifications. Certain provisions, such as scope and definitions, need greater legal clarity. In addition, a thorough analysis is needed to check the Directive's effectiveness going forward in a digital age, particularly in addressing the risks stemming from artificial intelligence, the internet of things and emerging robots.

We will ensure that our legal framework remains open and sufficiently flexible to innovation. That's why we are committed to preserving the principles of the new approach and consider the alignment of the Machinery Directive to the package of measures of the New Legislative Framework, which is expected to increase coherence with the other 22 Directives and Regulations already aligned.

We will also explore the possibility of allowing digital format for documentation accompanying the products placed on the market, which is expected to reduce costs for industry, though we have to carefully assess any potential negative impact on consumers.

The Commission assigned a study to an external contractor, to assess the economic, social and environmental impacts of different policy options identified. An essential component of the contractor's analysis is the stakeholders' contributions to the consultation activities. The open public consultation allows all interested stakeholders to share their views on ways to improve the legislation so that it continues to deliver its objectives efficiently.

Finally, yet importantly, in a world where wireless connectivity becomes ubiquitous and where the deployment of 5G networks is imminent, the Radio Equipment Directive, applicable to connected products, plays an important role in complementing the regulatory framework for machinery. Under the empowerment given by the European Parliament and the Council, the Commission can adopt measures to require that radio equipment is fitted with features to ensure the protection of users' privacy, protection against fraud and that upload of software does not affect the compliance of the equipment. Under this framework, the Commission is currently analysing whether possible measures to improve the security of connected products.

CECIMO's views on the review of the Machinery Directive

by Maitane Olabarria Uzquiano, CECIMO Manager Technical Regulations



The Machinery Directive (2006/42/EC) is one of the main pieces of legislation affecting the machine tool sector. The Directive has been very successful in ensuring a high level of safety and the free movement of machinery, while coping with technological developments.

CECIMO supports the proposal to align the Directive with the "New Legislative Framework" (NLF). The main objective of the NLF is to make EU product legislation consistent and easier to implement by, for example, having common definitions and provisions in relation to market surveillance, CE marking, etc. Manufacturers often need to comply with different product specific Directives and further coherence between different pieces of legislation can be beneficial. Transforming the Directive into a Regulation can also have some benefits since the same provisions would apply across the board directly in all Member States without the need for national transposition.

The main question though regarding the revision of the Directive is whether there is a need to introduce changes in the essential health and safety requirements to consider new developments in the sector. From the perspective of the machine tools and related manufacturing technologies, the essential health and safety requirements of the Directive already provide the necessary framework to ensure that safe products, including new technologies such as Artificial Intelligence (AI), are placed on the market. We should consider that, although technologies such as AI have evolved considerably in the last decades, the development of applications in the machine tool sector is still limited and at an early development stage. The requirements of the Directive already provide a technology neutral robust legal framework to ensure the safety of machinery. This framework is complemented by harmonised standards that can further define technical requirements considering the state-ofthe-art and new technologies.

Another important aspect being discussed has to do with cybersecurity. Cybersecurity is an issue involving a wide range of actors including not only manufacturers but also suppliers, software providers and users. The inclusion of cybersecurity requirements in a revised Directive would therefore not lead to an effective approach to cybersecurity and may instead open the way to a situation where different sector specific pieces of legislation include different and inconsistent requirements on cybersecurity. CECIMO's view is that a horizontal approach is better suited to deal with cybersecurity aspects.

Finally, CECIMO supports allowing for the provision of documentation, i.e. user manuals, in digital format. Although the Machinery Directive itself does not specify the form on which documentation needs to be provided, the Guide to the application of the Machinery Directive specifies that this should be done on paper. There are many advantages in the use of digital manuals including the possibility of easier updates, reduction of printing costs and environmental impact. CECIMO believes that manufacturers should be free to choose the best means to provide the required documentation as long as the requirements of the Directive are fulfilled, and the required information is provided.



In our experience, the Machinery Directive is working well. It is written in such a way that makes possible to cope with new technological developments. Rather than changing the Directive what we need is a stronger effort on market surveillance.

Massimo CARBONIERO Chairman of the CECIMO Technical Committee and Managing Director and Partner of OMERA SRL

Mercosur: a trade opportunity for the European machine tool sector

by José Ignacio Díaz Martínez, CECIMO EU Public Affairs Economist



With the EU-Mercosur deal, CECIMO companies with strong ties to South American markets could potentially become export leaders in the region. Conversely, Mercosur machine tool companies can take full advantage of this agreement by getting easier access to the European market and learning from our business models.

François DUVAL V.P. Business Development at Fives Machining



An agreement that brings down costs for our exporters and opens new business opportunities in foreign markets is an agreement for mutual growth, shared knowledge, employment and sustainability. The EU-Mercosur agreement, once it is in full force, will surely benefit all parties.

Carl DEWULF

President and Managing Director of LVD Company n.v. Mercosur is a trade bloc established in 1991. Originally a group of five, it currently comprises two major markets from South American, Brazil and Argentina, as well as two other relevant economies: Uruguay and Paraguay. Venezuela, the fifth party of the agreement, was suspended due to political reasons in 2016. Although the latter might seem as sign of instability or potential difficulties in the future, the bloc remains united and a future expansion of the agreement is foreseeable with the accession of Bolivia.

Widely known, Mercosur has recently become a relevant issue for policymakers and stakeholders alike, as the European Commission and the South American trade bloc have reached a trade agreement in principle. This new deal is noteworthy for various reasons. First, it is a trade agreement between two regions with considerable economic weight (their combined GDP is more than 20 trillion euros, according to the European Commission) and a significant population (a grand total 500 million people). Moreover, through this specific deal, the European Union will seek to cut tariffs, simplify customs procedures and help bolster the position of European manufactures in South America, in addition to guaranteeing the development of environmentally sustainable trade and business.

In general terms, trade in goods between the EU and Mercosur in 2018 was worth 88 billion euros, while trade in services amounted to 34 billion euros. Regarding the proposed tariff cuts, the agreement would eventually remove duties on 91% of goods that EU companies export to Mercosur, with an expected savings for European companies of around 4 billion euros. The industries that would benefit the most from this tariff cuts would be, among other, the automotive industry (taxed today at a rate of 35% over the export price), car parts (between 13 and 14%) and machinery (with a tax rate between 14 and 20%).

The European machine tool sector would greatly benefit from this agreement, as CECIMO has relevant trade ties with Mercosur countries. In 2018, CECIMO's absolute volume of export to Mercosur were worth 46,6 billion euros, while the imports volume reached 48,2 billion. CECIMO countries have then a trade deficit with Mercosur's machine tool industries. This negative trade balance was first registered in 2016 and remains to this day.

Nevertheless, this is not a sign of European weakness in the South American market. If we look at the growth rates, we notice that, since 2010, exports have grown at an average annual rate of 5,3% and imports by 2,5%. Moreover, the negative trade balance means that trade relations between the two machine tool industries are deep and dynamic, with companies producing and trading goods at a very similar scale. We can only assume that, if the agreement takes full effect, trade between CECIMO and Mercosur machine tool companies will increase overall and our exports, thanks to the aforementioned tariff cuts, would become more cost competitive. It is indeed an interesting business opportunity for European machine tool companies.



Final workshop of the IPR study

INTELLECTUA

roperty

by Vincenzo Belletti, CECIMO Innovation Policy Manager



CECIMO was actively involved in the IPR debate at EU level. We will continue to support the work of the European Commission making sure that there are no obstacles to future market uptake of the AM technology in Europe.

Stewart LANE

Chairman of CECIMO Additive Manufacturing Committee and Corporate Manager of RENISHAW PLC The increasing diffusion and implementation of AM technologies pose significant challenges for infringement and liability of intellectual property rights. IPR concerns related to the additive manufacturing sector are mainly based on the ease of digital file-sharing and increased access to 3D scanning and printing. The current IP legislation does offer clarity on the mechanisms for protection when it comes to many of the actors involved in the realization of the content or simple use of a CAD and STL files.

To collect more information on this topic, the European Commission launched a call for tender on the implication of IPR on industrial 3D printers.

The study started in May last year, aiming to understand the IPR framework for industrial 3D printers and identify gaps and challenges that act as barriers for the development of the AM industry in Europe. Furthermore, the results of the study will be used to feed the upcoming evaluation of design protection regulation.

The organizations involved in the study performed a literature review, an analysis of the value chain and stakeholder interaction (interviews with 41 industrial players representing different parts of the value chain).

The results were presented during an event hosted by the European Commission on the 14th of October. Their work analyzed whether the current IP legislative framework is still fit for purpose and what issues need to be addressed to exploit its full development (e.g. in the IPR protection of CAD files). The sectors investigated were seven: Automotive, Aerospace, Health, Consumers good, Construction, Energy and Tooling.

The final report lays out the definitions of technical aspects of 3D printing (e.g. definition of CAD file) as well as of the explanations of protections, exceptions, infringements and licensing related to IRP.

Furthermore, the report highlights that:

- Trademark protection should be extended to new classes to protect electronically downloadable content. For instance, a car should no longer be protected only under class 12 (for vehicles) but also in class 9 (for electronic files) as the file with the design of the car needs to be considered as a product. Protecting trademark in new classes to protect electronically downloadable content

- A "simple" CAD file does not fall under the legislation on design protection while the design incorporated in the file can be considered a product and therefore protected in case of infringements.

- Patent infringements related to the repair of objects need to be harmonized in Europe. In particular, there is not enough legal clarity on what extend repairing an object (patented) does not infringe the right of the patent owner.

- In Europe, there is no existing case law on Platform liability for CAD file sharing.

The results of the study will be published by the end of the year and will be publicly available on the European Commission website.



Towards a functioning and innovation-friendly framework for the automotive sector

An interview with Siegrid de Vries, Secretary General, CLEPA - European Association of Automotive Suppliers

Over the past years and starting with the Clean Air Policy Package (2013), there has been a strong focus on improving air quality and responding to the transportation's greenhouse gas emissions challenge. The EU has been strongly promoting electric vehicles but why nevertheless, work on internal combustion engines is still important?

This decade, there will be a clear focus on battery-electric technology, which is crucial in meeting emissions targets coming into force in the coming years. Nevertheless, efficient internal combustion engines will be a feature in personal mobility and goods transportation for decades to come. In 2030, automotive suppliers expect that up to 75% of all new vehicles will still contain a combustion engine, including as part of a hybrid solution. Therefore, even as electric vehicles grow in importance, there will continue to be a need to increase the efficiency of the traditional powertrain. To make traditional powertrains more efficient, regulators also should look beyond the engine and strengthen the deployment of advanced bio-based and synthetic fuels to make combustion CO2-neutral across the entire fleet. With the help of new and improved powertrain technologies, changed automotive usage models and a more efficient traffic and transportation infrastructure, the world can largely be rid of the air pollution created today at the point of

use by passenger cars and commercial vehicles, specifically in urban environments. The European supplier industry supports a technology-neutral regulatory framework to ensure that the most efficient solutions prevail in the market.

European Environment Agency (EEA) data published this summer suggest that average CO2 emissions from new passenger cars in EU28 increased for second consecutive year. Vehicle makers have repeatedly warned EU policymakers that Europe's auto industry will encounter serious difficulties to meet the EU greenhouse gas emissions targets for 2020 and post 2020. How do you see the way forward?

The European Union has adopted the most ambitious targets for carbon emissions from vehicles worldwide, and their application will create some hard facts. Numbers vary depending on the strategies chosen by manufacturers, but we assume that by 2030 a share of 40% of the vehicle fleet will need to be plug-in hybrid or fully electric in order to meet the fleet-average CO2 target. Today, we are not even at 10%. The rate of growth in electric-vehicles sales varies from country to country and depends quite substantially on factors that are outside the control of the automotive industry. These factors include consumer confidence, the need for a better charging infrastructure and the



The new European Commission aims to put forward a comprehensive strategy for sustainable and smart mobility which is aligned to its zeropollution ambition. CECIMO supports the EU transition to sustainable, digital and innovative mobility solutions. Nevertheless, CECIMO calls EU regulators to remain technologically neutral.

Rafael IDIGORAS Managing Director of SORALUCE S.COOP.







Machine tool consumption and car production go hand in hand. UCIMU has been using car production worldwide as an indicator for the forecast of machine tool consumption. We follow closely the future trends in the automotive sector, such as connected and automated mobility as well as electromobility. These trends have very important consequences on equipment and manufacturing strategies of vehicle components. That's why we try to anticipate the implications for our sector.

Alfredo MARIOTTI General Manager of UCIMU current inability of the electricity grid to transmit sufficient amounts of renewable energy. Also, in the absence of higher electric-vehicle sales volumes, these cars continue to be expensive compared with traditionally powered vehicles. There is a need for policy measures that support the mobility transformation now triggered by regulatory targets. Stepped up efforts to upgrade Europe's EV charging infrastructure would be one important action. Policy makers must also face the societal consequences in regions where jobs are at risk to disappear. European companies are world leaders in powertrain technology and sustain a highly skilled labour force across the EU, not least also in related sectors such as machinery and tooling.

The automotive industry has been one of the most important growth engines for economic welfare in Europe. How can Europe maintain its market leading position vis a vis China and US, especially in view of the threat of US tariffs on car imports from the EU?

Automotive suppliers, in their more than 100year history, have been champions in adapting to changing environments and seeking new product-and marketing opportunities. As global competition intensifies, the European supplier industry is investing more in R&D and developing the new expertise required to lead the technology-driven transformation of mobility. Important core expertise will cover areas such as software, artificial intelligence, connectivity, data analytics, electric and alternative powertrains, safety and battery cell technology. But next to these new automotive areas, traditional mechanical, electronics and general engineering skills will continue to support European suppliers' leading role in the mobility industry.

What are the issues that you would like the new College of Commissioners and the new European Parliament to put their focus on?

A functioning, reliable and innovation-friendly legal framework across European borders will be a prerequisite for continued success in a world increasingly characterised by global competition. European supplier companies can only be leaders in their field when their home market operates with as few internal barriers as possible. Moreover, an industrial policy for the EU should put more emphasis on the target of increasing manufacturing to 20% of the overall economy. With the European auto industry operating in a global market, EU policy makers need to be ready to mitigate factors that negatively impact European competitiveness. Europe also needs to have a flexible and adaptable business environment that helps foster innovation. Public support and funding for research and innovation projects, for example in the framework of the Horizon Europe programme, have an important role to play as well. Our vision, overall, is an optimistic one with regard to the future of the industry and mobility as a whole. At the same time, we believe that more concerted efforts by all mobility stakeholders are required to successfully make the transition from the traditional automotive industry to the highly diverse and very different world of new mobility.



umati: New dimension in networked production

by Alexander Broos, Director of Research and Technology, VDW

Umati – universal machine tool interface is going to become the new standard for Industry 4.0 communication of machine tools.

Started by a core team from the VDW (German machine tool builders association) in 2017, the initiative is now an international joint working group (JWG) together with the OPC Foundation.

The objective is to create an OPC UA companion specification and further software, testing and certification guidelines to successfully implement this into machine tools.

Umati has been established as a brand to communicate the initiative to the world of manufacturing. In the long run, umati will serve to establish trust amongst customers and suppliers by setting and observing quality standards.

OPC UA, as the underlying interoperability standard for umati, gained great momentum during the last 2 years. Currently there are 35 working groups underway to define companion specifications for their respective sectors. The base spec of OPC UA defines many aspects of communication, like protocols, security, and base data types. The definition of a "dictionary" for domain specific knowledge, however, is left to the experts from the different domains. Therefore, the umati working group was founded to create a common language for machine tools. The experts from this group are also involved in harmonization activities taking place within VDMA, the German Engineering Federation, for the machinery sector in general. The aim is to realize interoperability between machines of different sectors and prevent double work, all in close collaboration with the OPC Foundation.

The umati group is currently in the process to draft the first version of this specification. In March 2019, a first working draft was published by the JWG. Several presence and online meetings have taken place during the first half of 2019. Currently the core group is preparing the second draft based on the comments and feedback received. The aim is to be ready with a "release candidate" by the end of the year, but there is still a lot of work ahead.

The main scope for version one is asset management and status monitoring of machine tools, based on ten highly relevant use cases the group has identified. Use cases for Version 1:

- 1. Identify machines of different manufacturers
- 2. Overview if production is running
- 3. Overview of parts in a job
- 4. Overview of runtimes for a job
- 5. Overview of machine tool state
- 6. Overview of upcoming manual activities
- 7. Overview of errors and warnings
- 8. Providing information for KPI calculations
- 9. Providing data for media and energy usage statistics
- 10. Providing an overview of tool data

But the work is not done after version one of the companion specification. There are many more use cases already in the back log. Furthermore, the implementations in machine tools and software solutions are also on the roadmap, before the product can be brought to the market. The group is also supported and reinforced by developers and experts of the most relevant control manufacturers from Europe and Japan.

At the EMO Hannover 2019, the team staged a showcase to demonstrate how easy, secure and seamless umati, as a common interface, enables the connection of machine tools and software products. Therefore, an excerpt of the specification with a certain implementation guideline was published for the exhibitors to participate in this showcase. Additionally, a umati Dashboard was developed to visualize the data flow in the umati booth. During EMO 90 machines and 23 added value services were connected. The implementation took the companies just a few weeks. Then they were instantly able to connect to the dashboard and the added value services. The showcase was well received and the umati team could engage in many positive talks with prospects and customers.

The next and most important step after EMO will be to finalize and publish the OPC UA companion specification. In parallel, further aspects such as configuration guidelines, quality assurance and marketing will be further developed, so umati will be able to create a market impact which could already be anticipated during EMO.

More participation in umati is welcome! Please contact info@umati.info. ■



Hermle AG was present at EMO 2019 with six machines representina Hermle's portfolio of product and services. They represent examples of automation, digitalization and full machine power towards smart factory and industry 4.0. Thanks to UMATI, the new interface initiated by VDW, Hermle was also interlinked during EMO and showed the connection with its 5 axes machining center.

Franz-Xaver BERNHARD Member of the Board of Directors of Maschinenfabrik BERTHOLD HERMLE AG



The ISO Smart Manufacturing Coordinating Committee (SMCC)

An interview with Christoph Preusse, Chair of ISO/TMBG SMCC

The ISO Smart Manufacturing Coordinating Committee (SMCC) began its work in 2017, what is the goal of this group and who is involved in the work?

ISO Smart Manufacturing Coordinating Committee is a group of ISO's Technical Management Board (TMB).

SMCC's major goal is to enable the sharing of information among those ISO Technical Committees involved in Smart Manufacturing. With that, SMCC creates good emulation between stakeholders and new ideas and values in the respective committees.

SMCC facilitates the communication and coordination between Technical Committees and encourages the joint development of activities both within ISO and with other organizations, such as IEC and ITU, by serving as a ISO focal point for interfacing with other Smart Manufacturing bodies.

The outcome of this communication and coordination effort is the identification of new work on (or harmonization areas of existing) standards, to optimize the use of those standards. A positive effect is shared resources for the development or further harmonization of existing standards in Smart Manufacturing. Therefore, a permanent agenda item of any SMCC-meeting is the report of any TC regarding its activities, which influence and are influenced by Smart Manufacturing. In this case, we had to learn,that this influence is broader than we expected at the beginning: within the past three years, everyone internalized that security and safety are coherent partners within the whole value chain.

Another major goal was to develop a common definition of "Smart Manufacturing" with IEC. The next one will be the definition of "Digital Twin". Those definitions are the basic frame to have common understandings by using the same language.

As its name suggests, the SMCC is concerned with all the areas in ISO that fall within the scope of smart manufacturing, and establishes or reinforces relationships and concrete cooperation between them, represented by their chairperson or an appointed person representing the TC.

With the participation of joint technical committee ISO/IEC JTC 1 – the standards

development environment where experts from ISO and the International Electrotechnical Commission (IEC) come together to develop worldwide information and communication technology (ICT) standards for business and consumer applications – the SMCC is also able to incorporate the IT world and associated topics. Currently, there are 23 Technical Committees involved in SMCC.

Shortly to say, SMCC is a part of the puzzle to manage digitization within international standardization.

The smart manufacturing standards landscape is very broad and sometimes it is difficult to get an overview of all existing relevant standards. How is the group addressing this issue?

SMCC develops use cases as foundation material for committees working in the area of industrial Smart Manufacturing. This helps understanding and changing the relationship between new technologies, such as artificial intelligence, and the place of the human being in smart manufacturing in order to achieve successful outcomes from this collaboration. Such cooperation helps defining the role of humans in this new high-tech world as well. SM2TF, the "Smart Manufacturing Standards Map Task Force", is a merged group from both ISO Smart Manufacturing Coordinating Committee and the IEC SyC Smart Manufacturing (former SEC 7 of IEC). Here we recapitulate all the standards from both ISO and IEC, which relate to Smart Manufacturing. Furthermore, SM2TF will come up with a tool that evaluates gaps. The question is to figure out missing zones, where the content is developed by International Standards or Technical Reports.

You are also involved in the work of the ISO/TC 199 on Safety of machinery. In your opinion is the increasing adoption of digital and smart technologies in manufacturing affecting safety in a positive way?

For sure, in a very positive way!

Products will be more integrated in networks and IT security. Its combination with safety will be one of the fields that our industry must address. SMCC is one of the major "market places", getting affected information in multiple directions. That means that ISO/TC 199's thoughts will become basis for other TC's and JTC's as well.



AFM welcomes the work of the ISO Smart Manufacturing Coordinating Committee. Standards are of utmost importance for the adoption of new diaital technologies in smart manufacturing. Not only they address concerns related to the safety and security of machinery but they also help in agreeing on a global definition of relative new terms such as the "digital twins.

Xabier ORTUETA General Manager of AFM JTC 21 of ISO/TC 184 and IEC/TC65 are working on that item to address basic requirements on the intersection of safety and security. ISO/TC 199 WG5 is working on a second paper addressing smart technologies and artificial intelligence within safety of machinery. The revision of ISO 11161 (Integrated manufacturing systems) as well as the revision of ISO 13855 (Positioning of safeguards with respect to the approach speeds of parts of the human body) will incorporate digital and smart technologies.

The SMCC was created for a two years period. When will the group reach the end of its terms and what do you see as next steps?

When SM2TF ends up its primary work, a huge milestone will be reached. The end of the current

two-year term will fall at the end of 2020 and today's goals are reachable by that date. Beyond, ISO TMB will assess the effectiveness of the CC's work again, either confirming this approach and extending the CC's mandate, or exploring alternative coordination and cooperation options.

From today's perspective, the effectiveness, collaboration and outcome of SMCC is remarkable and equal to IEC's SyC SM. Therefore, it would be sustainable to retain that group as a focal point on ISO for interfacing with other Smart Manufacturing bodies. ■



Standards are important to hold the market leadership of our branch at global level and play an important role in the digitalisation of industry. It is important for our companies to get involved and bring their own requirements and experience to standardization so that the final standards meet the needs of industry. **Coordination of different** standardisation activities is also essential to be more effective and avoid duplication of work.

Berndt-Thomas KRAFFT General Manager of Metaltechnology Austria

Standardisation for Digitising European Industry

by Maitane Olabarria Uzquiano, CECIMO Manager Technical Regulations

The European Commission launched the Digitising European Industry (DEI) initiative in April 2016. As part of the Digital Single Market strategy, the DEI initiative aims at building on and complementing the various national initiatives for digitizing industry with the objective of helping European industry to benefit from the opportunities offered by digital technologies and innovation.

Standardization has a considerable impact on industrial competitiveness and is an important aspect of the Digital Single Market. At the end of 2017, the DEI together with the Multistakeholder Platform on ICT Standardisation (MSP) set up a Working Group with the aim of providing a comprehensive plan to foster standardisation in support of the digitalisation of European industry. CECIMO was appointed as one of the members of the Working Group together with other representatives from national ministries and actions on digitising industry, European Standardisation Organisations (ESOs), Public-Private Partnerships, and other relevant European associations.

The final report of the MSP/DEI Working Group was published in February 2019. The document examines the needs of the manufacturing industry for standards in order to enable the digitisation of industry and provides a mapping of relevant standardisation activities. The document also gives a first outline of possible further needs for new standardisation activities to close standardisation gaps in order to accelerate the process of digitisation of industry. It includes a series of recommendations and it proposes the creation of a Networking Platform that would help the synchronization and exchange between the different activities at national in support of the digitisation of industry.

Following publication of the report, the Commission contracted a facilitator to evaluate the results and recommendations of the Working Group, approach industry and other stakeholders to express their needs and draft a roadmap. The EU-funded OPEN DEI coordination and support action focusing on platforms and pilots supporting digital transformation has also started its work, which has a standardisation component.

The conclusion is that the work of the MSP/DEI Working Group has been very valuable and the work of the group is expected to continue based on the conclusions of the work of the facilitator and the OPEN DEI action.

The final report of the MSP/DEI Working Group can be accessed on the European Commission website. ■



The new ISO TR 22100-4

Guidance to manufacturers for consideration of IT-security (cyber security) aspects and their impact to the safety of machinery

By Otto Görnemann, Chairman of ISO TR 22100-4

Smart manufacturing and Industry 4.0 are key words we are already used to hear and are commonly used to define the application of digital technologies in the manufacturing sector. This application is not a single measure but a holistic project intended to adapt the manufacturing industry to the requirements and technologies of the upcoming digital society. The technical basis is a seamless communication in a chain which links persons, factories, machinery, equipment, logistics and products applying intelligent and fast digital networking. The idea is to create smart supply chains which encompass all phases of the lifecycle of a product, from the initial design through development and production. The application of up to date technologies in manufacturing, resulting in higher flexibility, also leads to a higher degree of complexity and unpredictability. Additional risks will also arise from the increasing interconnectivity and resulting vulnerability of the manufacturing systems to IT security threats.

Unfortunately, those threats may also have effect on the safety of the machinery, like the increase of speed on a production machine beyond the designed limit. On the other hand, they may also have an impact on the manufactured product, like food contamination due to unsuitable low processing temperatures or lack of mechanical stability on a die cast metal part due to the alterations of the alloy.

ISO/TR 22100-4, Safety of machinery – Relationship with ISO 12100 – Part 4: Guidance to machinery manufacturers for consideration of related IT-security (cyber security) aspects, has been drafted with the intention to give guidance to machinery manufacturers for appropriate consideration if IT security threats could have an impact on the safety of machines. It supports the application of ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction, the basic standard that states the methodology for the design of safe machinery.

This ISO Technical Report was developed by ISO technical committee ISO/TC 199, Safety of machinery through an initiative of DIN, ISO's member for Germany, which also holds the secretariat.





Industry 4.0 is becoming more and more prevalent in the shop floor. That's also why cybersecurity is gaining *importance for machine* tools and intelligent manufacturing systems. Swissmem has been raising awareness to its member companies with regard to the potential implications that a cybersecurity attack to the IT network - or any IIoT device - could have for the safety of the machine, continuity of operations and reputation of the company. In our view, having a commitment to cybersecurity within the company and employees who follow the security guidelines could substantially reduce the cyber risks.

Christoph BLÄTTLER Secretary General of SWISSMEM (Swiss Machine Tool Manufacturers) The starting point is the consideration of the characteristics of machinery safety versus IT security. While machinery safety is intended to prevent accidents and injuries, IT security is aimed to provide availability, integrity and confidentiality of the productive process through their IT elements. The conditions for those goals are also different. Since safety requirements shall protect all vulnerable individuals, their measures have to be transparent, while confidentiality is the key element of suitable IT security means. Therefore, machine safety and cybersecurity differ greatly when it comes to their objectives, methods and measures, but they are tightly interwoven in smart manufacturing.

The next issue is the consideration of both factors within the different legal frameworks but always under consideration of the leading standard ISO 12100. As a matter of fact, the EU Machinery Directive clearly states in Annex I that "the obligations laid down by the essential safety and health requirements only apply when the corresponding hazard exists for the machinery in question when it is used under the conditions foreseen by the manufacturer or his authorised representative or in foreseeable abnormal situations". ISO 12100 states also that the designer shall identify hazards taking into account the human interaction during the whole life cycle of the machine and their possible states as well as the unintended behaviour of the operator or reasonably foreseeable misuse of the machine. It can therefore be concluded that neither the EU Machinery Directive 2006/42/EC nor ISO 12100 are applicable or deal with any unauthorized manipulation by third parties (cybersecurity attack).

Nevertheless, it is wise that machine manufacturers take into account the possible effects on machine safety when machinery may be exposed to cybersecurity attacks as a result of intended connectivity to IT networks.

From this initial point, the Technical report recommends to start the machine design with the risk assessment process as described in ISO 12100 and then assess the possible vulnerability of the intended risk reduction measures. The machinery manufacturer should consider if the machine requires to be connected to a network, and in such a case limit IT-security threats by limiting the connection time, monitoring the connection and their access, or restricting the connection to a reasonable minimum.

The Report explains further the essential steps that should be taken by the manufacturer of machinery to address IT-security in general, pointing out that this requires the cooperation and coordination between the stakeholders, from the machinery users to integrators, machinery and component manufacturers. Those steps are:

- Identification of IT security threats & vulnerabilities;
- Protection through implementation of appropriate countermeasures;
- Detection of security attacks with suitable means;
- Response to attacks with activities to repel or mitigate them;
- Recover from attacks, restoring capabilities and services, security improvement.

In order to achieve suitable protection against IT-security threats, the Technical report gives some guidance to the assessing of those threats that may vary from the mere access to confidential data (e.g. for economic gain) up to extended damage to infrastructure or population (in the case of a terroristic act)

Last but not least, the technical report addresses some general guidance where IT-security is relevant to the safety of machinery. This includes the consideration of the whole machine life cycle, the selection of appropriate components which build in features to minimize their vulnerability. Suitable machine design, specially the topology of the IT-system, as well as measures for access control, are as important as appropriate instructions for use related to the IT-Equipment and interfaces.

Transition period for harmonised standards for presses

A new list of harmonised standards under the Machinery Directive was published in the Official Journal on 19 March 2019. The list withdrew the references of three standards on mechanical, hydraulic and pneumatic presses (EN 692, EN 693 and EN 13736). The withdrawal of references was done without foreseeing any transition period. This meant that products manufactured using these standards could not benefit from the presumption of conformity with the requirements of the Machinery Directive with an immediate effect as from 19 March 2019. Moreover, in the case of mechanical and pneumatic presses no new standards are available yet since they are still under development and are only expected to be finalized in 2020.

This created a particularly difficult situation for manufacturers of presses fulfilling the characteristics of Annex IV of the Machinery Directive, which in the absence of harmonised standards for their products could not use the internal self-assessment procedure anymore and needed to involve a notified body in the assessment of their products. Following meetings between CECIMO, the European Commission and the CEN-CENELEC Secretariat, the Commission finally agreed to provide for a transition period for the three withdrawn standards. An amendment to the list of harmonised standards was published in the Official Journal on 7 November 2019. This amendment included a transition period of 24 months (until 19 March 2021) for EN 693 on hydraulic presses and 30 months (until 19 September 2021) for EN 692 and EN 13736 on mechanical and pneumatic presses.



KRAKEN, the largest multi-material hybrid manufacturing system, presented in Spain

by Maitane Olabarria Uzquiano, CECIMO Manager Technical Regulations

KRAKEN is a Horizon 2020 funded research project that has developed an automated, robotic machine for hybrid multi-material manufacturing combining both subtractive and novel additive technologies. The project, which started in October 2016 and reached its end in September this year, was coordinated by AITIIP and included 15 partners from eight countries. A final conference took place on 25 September at the AITIIP Technology Center in Zaragoza (Spain) to present the KRAKEN machine and the main project results.

The KRAKEN machine

The main result of the project is the KRAKEN machine. The machine can produce large parts of up to 20 m long through Additive Manufacturing (AM) alternating material deposition with subtractive operations (layer-by-layer). The Additive Manufacturing system, provides metallic material using WAAM (Wire Arc Additive Manufacturing) at a deposition rate of 1.5 l/h. The KRAKEN machine also includes a resin extrusion system which can reach deposition rates of 120 kg/h, around 200 times faster than a conventional AM machine. A new two component machine-dispensable polyurethane paste (ALCHEMIX PU3720A/B) adapted to Additive Manufacturing has been developed within the KRAKEN project. The material is particularly suitable for the manufacture of design/styling or master models and once cured it can be easily machined to give a very smooth surface finish.

An arc spray metallisation process based on metal alloys has also been developed.

This metallization process enables the use of metal Additive Manufacturing on top of a polymer part. This new process, which can reach deposition rates of 6kg/h, opens new pathways for innovation in metallisation.

The high accuracy of the KRAKEN machine is achieved through the integration of real time laser tracking technologies. The laser tracker monitors and controls the position of the head 1000 times per second, correcting its position automatically. The system also incorporates two types of cameras and artificial vision systems to control the deposition flows and for the subsequent verification of the piece, through three-dimensional scanning.

In addition to the increase in productivity due to the accuracy of the machine and the increase in speed thanks to the high deposition rates achieved with the machine, the KRAKEN machine also uses 90% less floor space than alternative solutions thanks to use of a ceiling installation and the reduction of the workplaces needed.

Demonstrators and Industrial applications

The KRAKEN system has been validated through a series of demonstration cases.

Hybrid lining panels for road tunnels have been manufactured for Acciona, one of the consortium partners. KRAKEN multi-material capabilities have allowed to embed auxiliary elements such as electrical wiring for the emergency lighting and metal profiles for panels assembly, which can help speed up the installation process. Regarding the automotive sector, a mockup car of one of the latest Pininfarina car models has been produced to validate its design. The model has been manufactured in 1:2 scale by the KRAKEN machine and then finished by Pininfarina with other exterior features. The built piece has a size of 2.2x1x0.6m and a weight of 250kg.

These are some of the real applications that have already been tested, although the sectors that can benefit from this system are much broader. This technology opens the possibility to produce large parts of composite materials (carbon, glass...) for applications in sectors such as aeronautics, railways, maritime and large off-shore and wind infrastructure. This technology allows the incorporation of new thermal optimization and energy saving concepts by combining different materials and geometries in a single product.

E-learning platform

The project has also developed an e-Learning platform with comprehensive information on hybrid and additive manufacturing processes and the KRAKEN machine. This online platform is a resource for further developing and disseminating design, engineering and manufacturing knowledge and expertise in hybrid manufacturing. It is an important tool aiming at overcoming existing barriers in modern industrial production.

The platform can be accessed for free at the following website: krakenproject.eu/ elearning.

This project is co-funded





SAM, tackling the chronic skills shortage in additive manufacturing

by Vincenzo Belletti, CECIMO Innovation Policy Manager



Over the last ten years, additive manufacturing has grown into a viable industrial manufacturing solution. This growth has allowed the sector to develop into a key enabler for sustainable economic growth and driver of competitiveness.

But the advancements experienced by the sector have not been paired by the availability of a skilled workforce. In almost all Member States, a strategical approach to additive manufacturing is yet to be developed.

The current initiatives and projects tackle the skills' shortages "answering" to the industry's demand of personnel rather than "planning" how to develop competencies, which will be needed by the sector in the future. The time between the identification of skills shortages and the ability to deploy qualification/training modules does not fit the speed of this sector.

According to Ernst & Young, the demand for AM and related services has increased in the last years and it is expected that in 2020 the market volume reaches €10 thousand million. As Europe seeks to keep its leading position in industrial competitiveness, it is essential to establish a collaborative platform for AM skills at European, National and Regional levels.

The SAM project aims to solve this issue.

SAM is a four-year collaborative European project, which involves 16 partners including highly qualified researchers, academics and industries. The main goal is to develop an effective system for identifying and anticipating the right skills needed in the additive manufacturing (AM) sector.

The project will increase the attractiveness of the sector to young people, strengthen education-research-industry partnerships, as well as encourage creativity in companies, relevant educational and scientific institutions (e.g. the development of new industry-specific degrees, apprenticeships and training programs).

To achieve these targets, the SAM project intends to:

• Develop a skills strategy in additive manufacturing ,which supports growth, innovation and competitiveness.

 Undertake a systematic observation of current and future skills needs, facilitating the mapping of trends, shortages, and mismatch in policy and figures.

- Design, review and deploy relevant qualifications.
- Promote additive manufacturing as an attractive career choice.
- Compile an online qualifications catalogue to reference, update and enlarge the European AM Qualification System.

Furthermore, all activities undertaken will be promoted from project partners to different target groups, such as:

- Existing workforce
- Students from primary school
- Higher education (HE)
- Vocational education and training (VET)

The awareness campaign will stimulate the creativity of both the consortium and target audience.

The result of SAM, which will end on 31 December 2022, will be to establish a recognised International Qualifications System for Additive Manufacturing that will educate, prepare and upskill the workforce for the Additive Manufacturing sector.



Trinity



by Maitane Olabarria Uzquiano, CECIMO Manager Technical Regulations

Robotics, automation and IoT play a critical role in the factories of the future. These technologies are essential for manufacturing companies to increase productivity and their global competitiveness. New robotic technologies are highly flexible and cost-effective for nearly every size of company, including small and medium-sized firms (SMEs). Nevertheless, only a small percentage of companies is using these technologies. A key barrier to implementation is often a lack of skills and understanding around how to best profit from these technologies.

The aim of the TRINITY project is to help European SMEs to implement and benefit from these technologies, speed the technology transfer and shorten time to market. The four-year project started in January 2019 and is funded by the European Union's Horizon 2020 research and innovation programme. The main objective of TRINITY is to create a European network of local Digital Innovation Hubs helping companies to get access to advanced digital and robotic technologies for agile production as well as other services, such as training, funding or match-making. The network is composed of industry organisations, service providers, research institutes and universities specialised in advanced robotics, IoT and cybersecurity. The aim is to extend and build the network beyond the life-time of the project. An important part of the project will be the development of a digital access point which will facilitate access to the network, collaboration, networking and the dissemination of information and knowledge to the wider robotics research community and industry in Europe.

Use case demonstrators

The TRINITY partners will develop 18 use-cases in some of the most promising areas of robotics and digital technologies to advance agile production. These areas will include collaborative robotics as well as sensory systems to ensure safety, effective user interfaces based on augmented reality and speech, reconfigurable robot work-cells, peripheral equipment (fixtures, jigs, grippers, etc.), programming by demonstration or IoT secure wireless networks. The demonstrators will be developed in a modular way so that companies can use them as a complete solution or just choose some of the modules to meet their specific needs. Detailed tutorials on how to set up and use different demonstrators and their different modules

will be made available. The detailed description of the different demonstrators can be found in the TRINITY website: trinityrobotics.eu/demonstrators.

Funding opportunities

The TRINITY project will offer financial and technical support to European SMEs to test and benefit from these technologies through two rounds of open calls. The open calls will be launched in 2019 and 2021. Through these open calls SMEs can team up with technology providers, OEMs (Original Equipment Manufacturers), endusers and other partners to test some of the technologies showcased in the use case demonstrators developed by the TRINITY partners or to propose completely new demonstrators. Demonstrations are expected to increase the agility in the production by applying advanced robotic technologies, possibility supplemented by other digital tools, IoT and cybersecurity solutions. Selected companies can get up to EUR 300,000 through the open calls. The first call, for which EUR 4 million will be made available, will open on 20 November 2019. The open calls will be managed through F6S platform (https://www.f6s.com/trinitydih) and widely disseminated through social media and the project website.



Trinity Conference "Robotics for agile and competitive manufacturing" at EMO Hannover 2019.







Digital & Intelligent MOdular FACtories

by Dimitra Vasilia, CECIMO EU Public Affairs Manager

The digitalization of industry opens the path for mass customization but requires leveraging the existing manufacturing ecosystems and establishing a collaborative manufacturing environment. DIMOFAC project will enable the modularity, adaptability and responsiveness of a production line by the integration of Plug-and-Produce modules in a Closed-Loop Lifecycle Management System, for continuous production adaptation, optimization and improvement, in a fast and flexible manner. Reconfigurability is achieved by implementing a Digital Twin of each module and by deploying Digital Thread linking product and process dataflow, enabling seamless secure communication throughout the product lifecycle in factory and connecting it to the management systems in conformance to RAMI4.0.

The DIMOFAC consortium is issued from the leading European open initiatives on smart manufacturing, leveraging knowhow from past and running EU projects such as INTEGRADDE, COMMUNION, HIMALAIA, BRAINPORT, iM²AM, MIDIH, MARKET 4.0 and building upon a pre-existing network of open DIHs and competence centers such as SMART FACTORY KL, PICTIC, FFLOR, AFH, MANUHUB@WG. Partners will further extend their services and networks to leverage on the increased flexibility brought by modular production systems. Six industrial pilot lines, with multi-material manufacturing, additive manufacturing and assembly capabilities, will enable to demonstrate **DIMOFAC Modular Factory Solution**, with reconfiguration time reduction of production lines, up to 75% expected for interactive displays (SCHALTAG), 50% for cosmetic, aeronautic and additive manufacturing (ALBEA, EIRE COMPOSITES and SCULPTEO); 30% for shavers (PHILIPS) and industrial modules (VDL). A key result will be the network of open pilot lines, offering R&T and services supporting process validation and implementation in EU SMEs, Midcaps and large organisations in different sectors, spreading knowledge, awareness and adoption of DIMOFAC Modular Factory Solution.

In the DIMOFAC project, CECIMO will be in charge of standardization aspects within the project. Its goal will be to make sure that DIMOFAC's activities evolve in line with developments in the smart manufacturing landscape, both from a perspective of existing and under-development standards at European and international level. In order to do so and in cooperation with the other standardization partners in DIMOFAC, CECIMO will leverage its established connections with the standardization community. To this extent, as trade body representing the European machine tool industry and related manufacturing technologies, CECIMO has been and is today a leading member in a variety of standard-related platforms at global and EU level. For example, the Working Group on standardisation in support to the Digitising European Industry initiative of which CEICMO was part had been created directly by the European Commission to accelerate the transition of European smart manufacturers towards digitization. CECIMO has also numerous partnerships as liaison body with international bodies focused on smart manufacturing. All in all, the strategic position of CECIMO within the smart manufacturing community will guarantee a strong link between DIMOFAC and the array of current and planned standards in this field.

The project officially started with a kickoff meeting in Grenoble (France) on 6-7 November 2019. ■

This project is co-funded by the European Union





CECIMO Rapporteur for IIoT at the Strategic Forum for Important Projects of Common European Interest (IPCEI)

by Dimitra Vasilia, CECIMO EU Public Affairs Manager



The European Commission in 2014 has adopted a Communication on Important Projects of Common European Interest (IPCEI Communication). The aim of the IPCEI Communication is to allow Member States to support and boost the realisation of innovative projects that otherwise would not have taken off because of the significant risks they entail. In fact, where private initiatives supporting innovation fail to materialise - therefore there is a market failure -, member states can jointly fill the gap unlocking additional investments.

A successful example has been the project in microelectronics which was approved in 2018 by the European Commission. France, Germany, Italy and the UK gave \in 1.75 billion public support to a joint research and innovation project in microelectronics that aims to unlock an additional \in 6 billion in private investment. The project should be completed by 2024.

Building on this successful initiative and the European Batteries Alliance, the European Commission in March 2018 launched the Strategic Forum for Important Projects of Common European Interest (IPCEI). The aim of the Strategic Forum was to identify the key value chains of strategic importance to Europe and propose a common vision for joint actions and investments between member states and industry. Six key strategic value chains have been identified based on their potential impact on Europe's industrial competitiveness and the interest of the member states to support and develop coordinated actions in these areas:

- Connected, clean and autonomous vehicles
- Smart health

- Low-CO2 emission industry
- Hydrogen technologies and systems
- Industrial Internet of things
- Cybersecurity

The aim of the Strategic Forum is to deliver a report with specific Recommendations for the Strategic Value Chains to the European Commission which will contribute to the Commission's ongoing work to develop a longterm EU industrial policy with concrete measures for its implementation. Furthermore, the report complements the work of high-level Industrial Roundtable and the vision for industry 2030.

CECIMO has been an active member of the Strategic Forum comprising of few selected industry representatives, member states and the European Commission, in total 45 members. In our pivotal role as rapporteur for the Industrial Internet of Things Value Chain, we had the opportunity to underline the importance of data exploitation and artificial intelligence, digital twins and metal additive manufacturing and put forward Recommendations in the respective fields.

The final report will be published when the new European Commission takes office. CECIMO looks forward to the next steps and is committed to contribute to future actions in the context of the cooperation between Strategic Forum members, other stakeholders and the European Commission to ensure the competitiveness and technological sovereignty of European industry and manufacturing.

Our commitment to an EU Industrial Policy: Industry4Europe Coalition and EU Industry Days

by Damir Glas, CECIMO EU Public Affairs Officer



It is vital that EU leaders and policy makers understand the urgency to support European industry's long-term competitiveness. Our biggest challenge is to help industry to transform into a global technology and digital manufacturing leader.

Tomas HEDENBORG CECIMO Treasurer The industry is undergoing deep transformation driven by digital and other new technologies, and new business models. In order to ensure that our industry stays competitive in the global market, we need to set up a long-term industrial policy strategy with clear and forward-looking goals, which will contribute to strengthening Europe's industrial base and consolidating the single market, as well as boosting trade and the digital economy.

Industry4Europe Coalition, of which CECIMO is an active member, is a large and unprecedented coalition of organisations dedicated to campaigning for an ambitious EU industrial strategy. Together with 147 organisations – particularly industry associations – from across the EU and spanning most sectors of the economy, we are helping to set a long-term vision for the future of the EU industrial and manufacturing strategy.

Since its establishment in 2017, the coalition has issued several papers calling for a new ambitious EU Industrial Strategy in order to help the EU to remain a competitive global industrial power in the market. Our advocacy actions started with a list of indicators to economically and socially assess the European industry and monitor the progress made by the EU on the implementation of its industrial strategy. In addition, we have proposed a governance structure based on a constructive dialogue between the industry, decision-makers at EU, national, regional and local levels and civil society.

In the framework of the 2019 European elections, the Industry4Europe coalition issued a Joint Call to the candidates, as a part of the campaign to put industry at the top of the EU political agenda. The aim was to make industry the priority for EU policy makers, including future Members of the European Parliament and the future mandate of the European Commission.

Through the Industry4Europe coalition, CECIMO had the opportunity to speak in several high-level meetings and meet different EU officials and policymakers.

To support a renewed EU industrial policy strategy, the European Commission established the EU Industry Day, an annual event ahead of the spring European Council to ensure that EU policies deliver jobs, growth and innovation in Europe. During the 2019 edition, CECIMO organized a high-level conference on "Manufacturing and 4.0 Skills" focused on skills for industry and the digital economy. Together with representatives from the European Commission, industry, SMEs and other stakeholders we addressed the societal aspects



Industry4Europe coalition in Vienna with Ms Verena Seiser, Member of Cabinet of Economy Minister, Margarete Schramböck, in charge of EU Affairs.



Dr. Roland Feichtl, CECIMO President, at the EU Industry Days

of digitisation and provided recommendations on how to prepare talents for the digital transformation.

In March 2019 we published the CECIMO Manifesto for the 2019 European Elections. Once again CECIMO proved its commitment when it comes to defining the future EU industrial policy and setting the EU's annual and multiannual priorities by publishing the 10 key CECIMO recommendations. After the elections, the Manifesto was "rebranded" and the title changed as it was no longer valid. We kept the original 10 key recommendations and renamed the document as "CECIMO Recommendations for the EU strategic Agenda for the period 2019-2024".



CECIMO Panel at EU Industry Days



Jens Redmer from Google, at EU Industry Days

Brand new CECIMO website

In March 2019, we revamped the CECIMO website. Why?

We wanted a secure and modern site, that could provide visitors with a clearer view of what we do and that could stand cybersecurity attacks.

An easier navigation meant rethinking the old structure. Visitors now have a clearer view of the events we organise, the policies relevant for the machine tool industry and the statistics of the sector.

Visually, we opted for modern graphics and animated data that will make the reading enjoyable and compatible with the newest generations of phone, tablet and laptop. It allows us also to better share videos, images and infographics.

Lastly, on the technical side, the webpages' speed and their content are optimised to better rank on google, so people will find us easily.

We hope you are going to enjoy the CECIMO website and its new features!





Circular Economy

he concept of circular economy refers to an economy where the use of goods and materials is optimized, and waste is leminated or minimized. Resources are kept in use for as long as possible and or the end of the product Mecycle, resources covered to respective products and materials that can be used again to create further volue.

CICIMD published a "upon that shows how our sector is contributing to the circular economy. To implement these principles, our composes invest in new technologies, show here process and work on pladed standards. Also, policy instance con help by setting the right framework for our industry to take on this challings, i.e. support digitization and RBD. You can also worth the minimated video — here on the left side — that summarizes the main points.



Your insights on EMO Hannover 2019

by Giorgia Zia, CECIMO Communication Officer



From left to right: Adel Al-Saleh (Member of the Board of Management Deutsche Telekom AG), Andreas Scheuer (Federal Minister of Transport and Digital Infrastructure), Carl Martin Welcker (EMO Commissioner), Stephan Weil (Minister President of Lower Saxony) and Dr Roland Feichtl (CECIMO President).

EMO Hannover 2019 took place from 16 to 21 September, and around 117,000 production specialists from 150 countries convened at the world's leading tradeshow for the metal-working industry. More than half of all attendees came from abroad, mainly from other European countries and overseas. Compared to 2017, overseas presence grew by 20 percent and included a high percentage of Asian guests, who accounted for almost one third of visitors from abroad (maily China, Japan, Taiwan and India). This trend was clearly related to a higher number of Asian exhibitors at this year's event, who encouraged their customers to visit them in Hannover. Among the European countries, Italy, Poland, Sweden, Russia and Turkey performed really well.

"Against all expectations, we can wrap up EMO Hannover 2019 on a positive note. The fair is attractive for the entire international production technology community and has confirmed there is still demand for capital investment in the marketplace. In spite of all the political turmoil, this trade fair has revealed that industry is actively addressing the challenges of the future and is determined to make its contribution as a problem solver," concluded EMO general commissioner Carl Martin Welcker.

Digitalization and automation were at the core of EMO. As an innovations platform for production technology, EMO is expected to chart the trends for the years ahead and its motto "Smart technologies driving tomorrow's production" accurately reflected the key issues facing the industry today. According to exhibitors, customers were interested in discussing the whole process chain, including digital services. CECIMO, owning EMO's registered trademark, organised different meetings and event during these six days.

Throughout the trade fair, we hold different bilateral meetings with our international counterparts (IMTMA, AMT, CMTBA, JMTBA, ABIMAQ, STANKOINSTRUMENT and CARMAHE) to discuss with them bilateral relations and the international situation for our industry.

As a leading promoter of the machine tool industry at the European level, on 18 September we invited representatives of the European Union and the World Economic Forum. They discussed digitisation, trade, R&D, skills & education practices and solutions for energy-efficiency with European machine tool builders. After a lively debate, they had the chance to visit the stands of some of our companies and see with their eyes the latest on MT technology.

EMO Hannover was also the occasion to organise a couple of conferences. On 17 September the International Conference for Additive Manufacturing (ICAM) gathered more than 100 participants and its high-level speakers focussed on the increase in productivity of AM. On 19 September, we organised the conference. 'Robotics for Agile and Competitive Manufacturing'. We showed how new robotic technologies can be used to improve the agility, productivity and competitiveness of manufacturing companies, and present Trinity, a project we partner. Trinity was also the highlight of CECIMO booth as we exhibited a virtual reality corner and a demo-case about human - robot collaboration (a vision-based safety system for human-robot collaborative assembly of diesel engine components).

The European Machine Tool industry today: optimism amidst uncertainty.

by José Ignacio Díaz Martínez, CECIMO EU Public Affairs Economist

After a record-breaking year in 2017 and a strong 2018, the European MT industry seems to be experiencing a slowdown in 2019. There are two main sources that shed light into this: the guarterly machine tool orders data and business confidence indicator. In terms of orders, we see that CECIMO domestic, foreign and total orders have decreased during two consecutive guarters since Q4 2018. Moreover, year on year percentage change shows that CECIMO total orders have decreased more than 20% from Q1 2018 to Q1 2019. How orders progress is of relevance, as they help explain the current state of business cycle and provide a short-term indication of manufacturing's reaction to developments in production and trade.

Purchasing Manager's Index, the other sources, stands, as of July 2019, at 49,3 points for global manufacturing, clearly below the 50-point threshold, thus suggesting that businesses perceive a more difficult economic environment. Other sources, such as the OECD's Business Confidence Index show a similar downward trend. Its latest figure, for Q2 2019, is below the 100 mark (99,5), something not seen since 2013. With such economic sentiments and expectations about the future, the European machine tool industry might seem headed towards a period of underperformance.

However, if we look at specific data from our sector, the outlook is more positive. Machine tool production reached a total of 28 billion EUR in 2018 and, so far in 2019, registered production figures remain above 26 billion EUR. In terms of share, CECIMO total production for 2018 represented 35,4% of global MT production, while the figures for 2019 remains above 34,5% (which is two points higher than 2017's share). Production for this year remains strong and in line with 2018's volumes.

If we look at trade, we also see positive signs. CECIMO exports volume for 2018 was above 21 billion EUR, a 7% increase from 2017. In 2019, quarterly trade values show a slight decrease, but otherwise the values follow steadily the previous trend. Furthermore, CECIMO machine tool international sales comprise more than 97% of European machine tool exports.

More than 22% of total CECIMO exports supply Asian markets and China remains our largest buyer. In Europe, MT exports from CECIMO members to other European countries represented more than 55% of our total exports in 2018. Thus, we are still leaders in our natural market. Data from 2019 suggests that our European share should remain stable or even increase. On the other side of the Atlantic, we see that the CECIMO's export shares have decreased by only 1% compared to 2017, standing at 15% of total exports in 2018. However, the United States continues to be our second business partner and our export volume to the American market has increased consistently over the last five years, reaching 10,5% of total CECIMO exports.

Regarding imports, other European markets are still the main suppliers for CECIMO countries, which is consistent with the intra-European nature of the trade relations of our sector. In general terms, we see that European markets provide around 63,2% of total imports for CECIMO, almost the same share as 2017. The available 2019 data shows that European imports will remain at that level throughout this year as well. Beyond Europe, Asian markets are our main external market for 2018, providing 31% of our total imports (the same percentage as 2017).

In terms of consumption, our global share stands at 23% in 2018, the same as in 2017. We have been able to keep this mostly because of our consumption growth rate, which has been consistently above 2% since 2016. According to our forecasts, 2019 could witness a small decrease in our global share, the first one since 2015, but this would not diminish significantly our overall levels of consumption and . growth could restart from 2021 onwards with an average rate of around 3%.

The current economic environment may indeed seem uncertain. Political tensions in the Middle East and Asia and the unclear outcome of Brexit contribute to hindering business confidence. Also, official forecasts on economic growth for the European Union show a rather weak growth rate (1,2%), stagnant investment and less dynamic national labor markets. Additionally, the Chinese economic outlook is not clear, as its growth rate seems to have gone down notably and the ongoing trade war with the United States is creating strains in Chinese industries. This, however, should not divert us from the fact the CECIMO has had a strong 2018 and that our sector is well prepared to face future challenges.



2017 and 2018 have been strong years for our industry. The possibility of slowdown in 2019 is of course a concern, but we should always consider the broad economic picture and not just the short-term signs. Our production has increased, and we have a solid position in foreign markets, not just in Europe. We are strong and ready to face the challenges.

Marcus BURTON Chairman of CECIMO Economic Committee and non-executive Director of Yamazaki Mazak UK Ltd



Advanced production technologies for circular manufacturing

by Maitane Olabarria Uzquiano, CECIMO Manager Technical Regulations

Innovative and cutting-edge technologies, such as Additive Manufacturing, automation, digital or laser technologies provided by the machine tool sector help in achieving more sustainable and circular manufacturing. This was the key message of a conference organized by CECIMO in partnership with the 2019 EU Green Week and the European Economic and Social Committee. The event was organised in Brussels on 23 May 2019 and aimed at discussing the role of new advanced manufacturing technologies in the implementation of the circular economy.

Sustainable growth as a political priority

Tellervo Kylä-Harakka-Ruonala, Vice-president of the Employers Group at the Economic and Social Committee, opened the event by highlighting the circular economy was at the heart of sustainable development, which was of the priorities in the agenda of the Economic and Social Committee. She added that the circular economy was not a zero-sum game and that it had the potential to bring about triple wins in terms of environmental, social and economic aspects. She pointed out that while businesses had an important role to play in a transition towards a more circular economy, policy makers also had a crucial role by providing enterprises with a policy and regulatory framework that enables and encourages enterprises to innovate, invest and lead the way to smart, low carbon and circular economy.

Sustainable growth through a better functioning single market, climate and security was also one of the main priorities of the Finnish presidency, to take place in the second half of 2019. Janne Peltola from the Permanent Representation of Finland to the EU, highlighted the need for adopting a more holistic approach, where single market, industrial policy, digitisation and the external policy dimension were strongly interlinked and complementing each other to pursue growth. He also pointed out that the flight against climate change was also important for the competitiveness of the EU. The EU has a leading role in a transition to a climate neutral economy and should promote climate neutrality worldwide. He pointed out it was vital to foster multilateral cooperation globally to reach the energy targets in the most efficient way.

Cosmina Miu on behalf of the Romanian permanent representation highlighted the word done under the Romanian presidency in relation to industrial policy. She highlighted that the Competitiveness Council Conclusions on Industrial policy welcomed the full delivery of the circular economy Action Plan but that further work was still needed. She stressed the important role of new technologies, the need to support innovative SMEs and to focus on new business models.

Talking about the next European Commission, Ruben Dekker seemed to be convinced that the push towards sustainability would remain and it would include an approach to the circular economy. He also stressed that better synergies needed to be built between circular economy, climate and digital policies.

The machine tool sector as provider of more sustainable manufacturing technologies

Filip Geerts, CECIMO Director General, introduced the recently published CECIMO report on the European Machine Tool Sector and the Circular Economy and highlighted the role of the sector as a provider of advanced manufacturing technologies contributing to a more circular and sustainable manufacturing sector.

As explained by Stefan Dahl, Head of Advanced Manufacturing at GF Machining Solutions, one of these technologies is laser surface texturing. More than 80% of textures in manufacturing are done by chemical etching. Laser texturing technologies provide a cleaner alternative to etching processes and create 3D textures directly out of digital data. This means no use of chemicals, a 100% repeatable and simplified process, a reduced scrap level and a full digital process: all contributing to a more sustainable production and products. He also pointed out that an important aspect to consider was how advanced manufacturing technologies could help to produce parts with superior efficiency in their life-time. To this respect he gave the example of Gasoline Direct Injection (GDI). Through this technology gasoline is injected directly in the chamber saving 15% of fuel compared to previous gasoline engine technologies. The development of GDI was only possible with the development of a new manufacturing technology, phentosecond laser drilling.

Regarding demand for more sustainable technologies Monika Šimánková, CEO of Hestego, highlighted that more sustainable technologies if coming at a higher price should also be accompanied by additional benefits in order to



Circular economy targets quite often go hand in hand with business targets. More efficient solutions for manufacturing are typically also helping from the sustainability and circular economy point of view.

Juha MÄKITALO CEO of PEMAMEK OY



By introducing robotics and automation technologies we were able to reduce the environmental impact of the company. We reduced energy consumption by around 30% and CO2 by more than 400 tons/year.

Monika ŠIMÁNKOVÁ General Director of HESTEGO a.s.



be accepted by customers. There is always the need to build a business case and show how these technologies can translate into higher productivity and increased efficiency.

The role of digital technologies

Stefan Dahl and Philippe Reinders Folmer, General Manager Renishaw Benelux, highlighted the role of digital technologies in relation to sustainability. Renishaw explained that machine tools are "blind", they do not know exactly where the piece or the tool is. Through in process-monitoring and control, the operator can oversee the whole process rather than checking the piece at the end of it. The process can be then corrected while still running, which results in less waste and more efficiency.

Stefan Dahl also explained how digitization can help in the remote servicing of machines, meaning a faster solution of problems, reduction of downtime, increased production capacity and saving resources. During the panel discussion and looking at the future, Juha Mäkitalo CEO of Pemamek, stressed that digitisation was the area to concentrate on. He added there were hardware technological developments that could advance circular manufacturing, but the biggest developments were coming from the software side. To this respect, Stefan Dahl pointed out that 30 to 50% efficiency gains can be achieved through software improvements.

Additive Manufacturing as enabler of the circular economy

Additive Manufacturing (AM) can contribute too to sustainability by using only the needed materials and by consolidating the number of components within an assembly. Both Philippe Reinders Folmer and Erik de Zeeuw from Materialise highlighted how AM helps to save resources and, in some cases, to produce lighter parts. Such a characteristic helps to reduce energy consumption during the use phase of the product, which is especially important in sectors like transport. They also pointed out at AM as an interesting technology in relation to customised products, small series and production on demand. Looking at the future, Erik de Zeeuw pointed out that further research should be done on material uses and efficiency for AM.

The need for skills

Both Cosmina Miu and Juha Mäkitalo highlighted the importance of skills and education in relation to the transition to a circular economy. Cosmina Miu stressed the importance of STEM (Science, Technology, Engineering and Mathematics) education and she pointed out that the need for skilling and re-skilling would be a problem we would face more and more. Juha Mäkitalo agreed with her and stressed that in an area such as the machine tool sector where a product can have a lifetime of 30 or even 40 years, it was necessary to keep specialised knowledge not only on current and future technologies and products but also on the past ones.

No one-size fits all solutions

Said El Kadraoui from the European Political Strategy Centre concluded the panel discussion by pointing out that moving forward with circularity implied a lot of things and that there was no silver bullet to get there. The transition would require further research and innovation, collaboration with customers and new skills. He pointed out that policy makers may need to look at different sectors individually and see how best they can support the transition to a circular economy.

Circular ambitions

by Karmenu Vella, European Commissioner for Environment, Maritime Affairs and Fisheries 2014-2019



A circular economy is the logical solution for a resource-constrained world.

Here in Europe, we import six times more materials and resources than we export, and resources make up the largest part of companies' costs. To keep Europe competitive, we need to maximise resource efficiency and put the materials contained in our waste back into productive use. We need to replace virgin materials with recycled secondary raw materials, in a circular manner, on a European scale.

Taking a sustainable path requires fundamental changes throughout the value chain, from product design, production processes and business models to consumption patterns, waste management and the use of secondary raw materials. This in turn calls for technological, financial, social, and organisational innovation, with new forms of governance that enable and encourage public and private actors at all levels to play their part. It's ambitious, but it's eminently feasible.

As this report shows very clearly, the machine tool manufacturing sector is rising to the challenge. Numerous actors are rethinking traditional industrial processes, eliminating unnecessary waste, developing innovative advanced manufacturing technologies and doing all they can to promote recycling and reuse. By taking a whole life-cycle approach, the sector is putting circular thinking into action on the ground, and setting out a model for others to follow. And with so many SMEs focused on export, you are showing the best face of high-tech EU manufacturing to the world.

The EU too is doing its part, striving to energise markets through a mix of updated legislation and dedicated projects. The centrepiece of Europe's waste legislation, the Waste Framework Directive, was recently amended, raising recycling rates and introducing general minimum requirements for the design and operation of schemes for Extended Producer Responsibility.

Europe has everything to gain from the further development of applications and manufacturing technologies that optimise the use of resources and materials. Funds are available to help develop new applications to accelerate the transition to a circular economy, and to bring them to the market under Horizon 2020 and its successor Horizon Europe, the EU funds for Research and Development. I would strongly encourage you to make the most of these opportunities.

I wish the industry sustained success with its circular ambitions. With your high rates of re-use, remanufacturing and recycling, you are forging a path that many other industries can follow. Congratulations on the excellent results to date – and long may this trend continue.

CECIMO for Additive Manufacturing



The fifth edition of AMEC takes place on 4 December 2019 in the European Parliament.

Additive manufacturing shapes the sustainability of value chains, creating new opportunities for industry, society and the environment. The fifth edition of the Additive Manufacturing European Conference (AMEC) will show the benefits of faster deployment of AM solutions in EU strategical sectors (transport, energy and healthcare). Policymakers and business leaders will meet to discuss additive production and its potential for European businesses.

To know more about AMEC, visit our website <u>www.cecimo.eu/events/amec/</u>.



We are seeing in Europe an increased use of AM technology in different industries and a better integration of AM into existing design and production chains. Though these progresses are evident, there are still challenges for this technology such as the lack of trained workforce, high production costs and slow market uptake in some key sectors.

Filip GEERTS CECIMO Director General CECIMO not only organises conference but also participates in conferences around Europe to promote the Machine Tool Industry and our view on additive manufacturing.

Among others, our dedicated team spoke at:

TCT Japan 2019 (Tokyo, 29-31 January 2019)

Additive World Conference (Eindhoven, 20 March 2019)

2019 SIMM Exhibition (Shenzhen, 27 March 2019)

Brabant Metal Days (Den Bosch, 10-12 April 2019)

Additive is Addictive annual conference organized by Agoria (Brussels, 9 May 2019)

3D Printing within the Plastics converting industry (Brussels, 14 May 2019)

World 3D Printing summit & expo (Riyadh, 7-9 October 2019)

TCT China 2019 (Shenzhen, 16 October 2019)



Meet a CECIMO Delegate

An interview with Bastiaan Clement, CEO, STYLE CNC MACHINES Group



Which are your reasons to be a CECIMO delegate and, in particular, what are the benefits?

The main reason? To meet the best! For our company and for me, personally, it's a good way to meet the best in our industry during high level meetings. The information provided by CECIMO is correct, interesting and excellent. It gives me the change to think differently and shows me a diverse spectrum. But it shows me that I think different than the other bigger companies, which can, in return, be interesting for them.

What are the new challenges set by digitisation? How do you think the European Commission can help machine tool industry coping with it?

This is a very interesting topic. Of course, the big companies in our industry are focusing on digitisation, but the smaller ones, that are producing small series, focus on their daily job and have a different idea about digitisation. The EU should open programmes for SMEs to move the first steps into digitisation: the EU should get in contact with SMEs and inform them about what is happing in the world, where our industry is going and what they should do to be better prepare for the future. A lot of companies live day by day, but the EU needs to open their eyes, not only with slogans like "Industry 4.0". Nobody understands what it means anymore, and companies are using it for everything. The European Institutions should explain more to our industry what will happen (or it expects it will happen) in the future. Companies, on their side, can then participate in this process by finding new staff, upgrading the machine park, automating it and so on.

How do you attract young talents to your company and what are the skill gaps you face when recruiting?

Our company is an example of how our industry can still attract young talents, as we face no problem in hiring young talents and we could even hire more people than what we want to. First of all, you have to focus on the current staff instead of new staff. If the current staff really enjoy working for your company, they will show it and tell it to other people. Companies should also be transparent: we present each month to our staff all facts, like sales, production and the financial situation. We work with a few words that really stands for STYLE CNC Machines, and these are Fun, Loyal, Pride, Active and Passion. When we do something, we do it by keeping these words in mind. We use also all the modern ways of communication, by being very active on all types of social media, where we can talk to young talents.

Last week, we organised an open day and we invited the families of our staff. I had the chance to speak with the wife of a colleague and she told me something very interesting. Her husband really likes to work for our company because - he told her - there isn't really a boss. Of course, there is a CEO, but people feel responsible for what they do because they take that responsibility by themselves . I think this was the biggest compliment for our company.

How do you see the development of the Machine Tool sector in the coming years and how can CECIMO contribute to it?

I think that CECIMO can contribute well on how the promotion of the Machine Tool sector in the market. Some questions pop into my mind: how can we get young generations interested in the Machine tool business? How do young people look at our sector? What is our image? If it's bad, how can change it?

The Role of Industry and Machinery in the Economy of the Czech Republic

Manufacturing is a strategic segment of the Czech economy. It is an important vehicle for the development of technology, knowledge and job opportunities. It has a long tradition in the Czech Republic and has demonstrated in its development the ability to maintain its position in a competitive environment mainly due to the entry of foreign capital and involvement in regional and global value chains. At the same time, the high degree of integration and connection to foreign trade makes this kind of industry sensitive to changes in external conditions.

The Czech Republic is one of the countries with the highest share of manufacturing industry in the economy; it is placed behind Ireland in the scale of EU-28. Manufacturing contributes with about 27% to gross value added and employment.

The dominant sector of the manufacturing industry is the automotive industry, which also acts as a multiplier factor for the development of other downstream industries. Other sectors in the order of size include the production of metal structures, machine production, which also includes machine tools, computer manufacturing, production of electrical equipment, rubber and plastic and electrical equipment as well as food production.

Association of Engineering Technology (SST) is the voice of Czech machine tool industry

Machine manufacturing is one of the traditional and important sectors of the manufacturing branch. The machine tool industry also belongs to this group. The need to establish its own professional association arose shortly after the Velvet Revolution.

Association of Engineering technology (SST) was established in the year 1990. 21 companies from the Czech Republic and the Slovak Republic, which were engaged in research, manufacturing and sale of machine tools, were the founder members. Among these companies were the bearers of well known trade marks as TOS, MAS, ZPS, Šmera, ŽĎAS etc.

45 important companies from the Czech Republic and the Slovak Republic are members of the Association at present time. Association members established in the Czech Republic represent more than 70% of machine tool production.

SST has been a member of CECIMO since 1996. It ranks 8th among the 15 national European associations in terms of production and is the only representative of the so-called "Eastern Bloc countries".

SST is the only one and main representative of common interests of machine tool industry. The main activity of SST is increasing the image of its members and their products.

SST promotes the priorities of the industry to keep and improve the branch position in technology innovations and economic development.

SST is co-organizer of the International Fair of Machine Tools (IMT Brno) and guarantees its increasing technical level in the centre of Europe.



Visit of the Prime Minister of the Czech Republic, Andrej Babiš, to the SST exhibition at the International Engineering Fair Brno 2019.

SST cooperates as association member to EMO fairs organized by CECIMO.

SST also supports the cooperation of member companies with political, scientific an administrative structures in Czech Republic.

SST provides the collection and evaluation of statistical data in the machine tool branch not only inland, but also in Europe and worldwide.

SST edits the Annual Reports on the machine tool branch and the quarterly information about export and import, including annual forecasts.

SST is a collective member of the Confederation of Industry of the Czech Republic and is also represented on the Board of Directors of this Confederation.

SST edits three times a year the specialized SST Magazine.

SST supports technical education

SST pays special attention to the development of technical education, especially in the field of mechanical and electrical engineering, within the full course of studies, meaningapprentice centres, secondary schools, technical universities and scientific centres. SST supporst the development of technical secondary and apprentice schools especially in the field of machinery and electrotechnics through various presentations, competitive and subsidy activities;

SST cooperates with technical universities in the field of professional profiles of graduates and content of the special education programs.

SST influences actively the planned reform of technical universities and supports and ensures the participation of the association's members in the Boards of Directors of technical universities;

SST talks with the government and public organizations about the problems of schools in the field of mechanical engineering and enforces the branch interests.

Within the MSV / IMT Brno, SST organizes a competition for students of technical secondary schools in programming CNC machine tools.

In 2018, the world production of machine tools reached a new maximum of € 73.7 billion. The share of CECIMO, of which SST is also a member, reached 35% of world production. In the Czech Republic we achieved very good results, which in 2018 significantly exceeded the 2017 figures. Compared to 2017, production and total exports increased by 21.6 resp. 18.6%. The Czech Republic

has maintained in the long term the 13th - 15th place in the world production and the 12th - 13th place in the exports. Within the 15 CECIMO countries, the Czech Republic maintained the 8th place in production and 7th place in export in 2018.

Our main export countries are Germany, China and Slovakia. Russia, which was second only 5 years ago, is now the fourth one. It was very difficult for Czech exporters to eliminate the slump on the Russian market. Strengthening the market positions in Germany, China and Poland not only fully offset the decline in exports to Russia, but allowed a record level of exports to be reached in 2018. New product exports accounted for more than 75% of production.

Consumption of machine tools increased by 11.5% in comparison with 2017, in line with the peak of the manufacturing industry. Most domestic consumption is covered by imports. Deliveries of domestic producers to the Czech market increased by 20% and their share on the domestic market reached on average 22%.

The main trading partners of machine tool manufacturers are motor vehicle manufacturers and their subcontractors, aerospace industry, producers of railway equipment, agricultural and construction machinery, producers of power equipment and medical technology.

The main current challenges in this field are the lack of skilled workers, the pressure on automation and robotics and the further development of digitization and connectivity under the concept of Industry 4.0. Research and innovation in production are crucial nowadays.

Since the end of 2018, we have been seeing signals of demand cooling from engineering companies. Since Q4 2018, there have been concerns about the inflow of orders and sales assurance in 2019. After Q2 2019, it is already clear that 2019 will mean a significant decline in all indicators.



Oldřich PACLÍK General Manager of SST

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46 cecimo magazine | Fall 2019

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Book your calendar

CECIMO 2020 Spring General Assembly 6-9 June 2020 - Edinburgh, United Kingdom **CECIMO 2020 Fall General Assembly** Dates TBC - Brussels, Belgium

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Member Associations

Austria: Metaltechnology Austria Die Metalltechnische Industrie www.metalltechnischeindustrie.at/en

Belgium: AGORIA Federatie van de Technologische Industrie www.agoria.be

Czech Republic: SST Svazu Strojírenské Technologie www.sst.cz

Denmark: The Manufacturing Industry a part of the Confederation of Danish Industry ffi.di.dk

Finland: Technology Industries of Finland www.teknologiateollisuus.fi

France: SYMOP Syndicat des Entreprises de Technologies de Production www.symop.com/fr

Germany: VDW Verein Deutscher Werkzeugmaschinenfabriken e.V. www.vdw.de

Italy: UCIMU Associazione dei costruttori Italiani di macchine utensili robot e automazione www.ucimu.it

Netherlands: FPT-VIMAG Federatie Productie Technologie / Sectie VIMAG www.ftp-vimag.nl

Portugal: AIMMAP Associação dos Industriais Metalúrgicos, Metalomecãnicos e Afins de Portugal www.aimmap.pt

Spain: AFM - Advanced Manufacturing Technologies Asociación española de fabricantes de máquinas-herramienta, accesorios, componentes y herramientas www.afm.es

Sweden: SVMF Machine and Tool Association of Sweden www.svmf.se

Switzerland: SWISSMEM Die Schweizer Maschinen-, Elektround Metall-Industrie www.swissmem.ch

Turkey: MIB Makina Imalatcilari Birligi www.mib.org.tr

United Kingdom: MTA The Manufacturing Technologies Association www.mta.org.uk

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CECIMO is the European Association representing the common interests of the Machine Tool Industries globally and at EU level. We bring together 15 National Associations of machine tool builders, which represent approximately 1500 industrial enterprises in Europe (EU + EFTA + Turkey), over 80% of which are SMEs. CECIMO covers more than 97% of total machine tool production in Europe and more than one third worldwide. CECIMO assumes a key role in determining the strategic direction of the European machine tool industry and promotes the development of the sector in the fields of economy, technology and science.