



Fall 2014
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Where manufacturing begins

magazine

New era, greater role:

Machine tools play their role in tackling societal challenges



The machine tool industry is to leverage on additive manufacturing - CECIMO becomes the voice of the industry



Advanced Manufacturing must be a top priority for the new European Commission

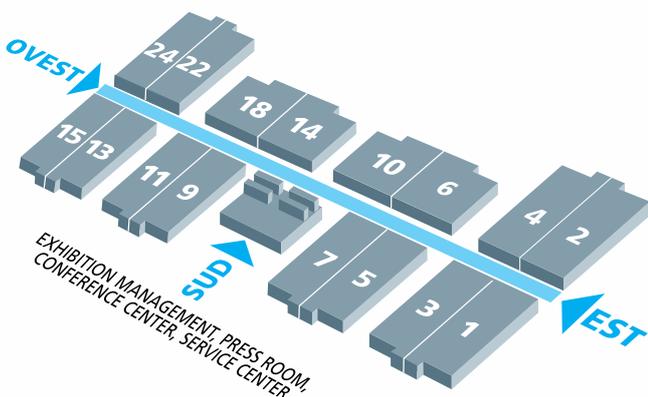


Chinese machine tools market outlook: China buys more machines and leapfrogs into automated solutions



Let's build the future

Machines to build the future, cutting-edge solutions that give the possibility of achieving what mankind has imagined, and technologies on which the improvement of the quality of life depends: this and much more will be EMO MILANO 2015. The spotlight will be on the wide offer of machine tools available, capable of attracting users from all the main sectors that use metal working systems.



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The machine tool industry: an invaluable asset for Europe



Dear Members of the new European Parliament and European Commission, dear readers,

Europe has the world's most advanced and largest machine tool production base. The share of Europe (as represented by CECIMO countries which cover 98% of total European output) in global machine tool production was 39% in 2013. European exports, including intra-European trade, amounted to nearly 50% of world machine tool exports. This means every second machine tool traded in the world originated from Europe.

In the most industrialized regions of Europe which include, inter alia, Baden Württemberg, Piemonte, Basque Country, Paris-Ile-de-France, Bohemia and Moravia, Land Oberösterreich and the West Midlands, hundreds of small and medium-sized suppliers of machine tools are located side-by-side with Europe's industry giants in automotive, aerospace, energy generation and mechanical engineering sectors. They supply production technology and equipment to above-mentioned downstream users and many other sectors from med-tech to electronics sectors. Machine tools provide the entire industrial base with significant productivity and efficiency gains, thus underpinning the competitiveness of European manufacturing. The machine tool industry is a strategic enabling sector.

The strength of Europe in the machine tools sector lies in sophisticated engineering know-how, a highly skilled workforce, a world class research infrastructure and the existence of an industrial ecosystem linking them to excellent upstream suppliers (i.e. metal industries, electrical engineering, electronics) and to a strong user base. The competitiveness of European manufacturers builds on their ability to provide fit-for-purpose solutions to complex needs of customers. Metalworking technology allows industrial users to process materials into high value-added parts and components which are then assembled into high quality final goods destined for global markets.

Despite the fact that many industries shifted a significant share of their production outside Europe over the last decades, the machine tool industry has proved to be very resilient to relocation pressures. Due to requirements for high quality and protection of valuable know-how, important manufacturing operations are kept in-house. It is actually one of the few manufacturing sectors in Europe which records a trade surplus (more than EUR10 billion) with the rest of the world. These export champion companies generate quality jobs in their regions and contribute to socio-economic development. Moreover, machine tool suppliers continue providing solutions to imminent challenges to our society such as climate change, mobility, ageing society and dependence on fossil fuels.

We would like to encourage the new European Parliament and the European Commission to take a close look at the successful development of the machine tool industry in Europe and promote an industrial strategy which is based on regional specialization attached to global ambitions. At the same time it is of utmost importance that European policy-makers make an effort to understand challenges facing this sector to help it thrive in the new era of smart inter-connected production.

We will be communicating through CECIMO magazine the successes and needs of the sector to your attention. Stay tuned!

Filip Geerts
Director General

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In search for the best financing practices for the sector

During the General Assembly in Prague CECIMO delegates took under investigation the financing opportunities of the sector and its clients. A panel and workshop were organised to find the best solutions for machine tool sector and its clients.

European machine tool production has recovered from the 2009 crisis to the level of 22.8 billion euro in 2013. However the machine tool consumption lags still behind reaching to 12.5 billion euro that is about the quarter less than before crisis. The bursting stock exchange bubble froze the situation on the financial markets considerably. Despite several studies, like the European Commission's the SME Access to Finance (SMAF) index or the European Central Bank's Bank Lending Survey, show the improvement in access to financial resources, European manufacturing feels often severe credit constraints. Also in CECIMO's Business Climate Survey European machine tool builders cite access to finance as an important obstacle to running their business and to their customers.

Public sources

CECIMO's strategic day was dedicated to both public and private financing in Prague. Experts from European institutions to commercial banks provided extensive overview about their area. The initiatives can be divided broadly into subsidies or grants and financial instruments like loans or venture capital.

For example, state aid in form of direct capital injections played important role in restoring confidence in the financial sector and avoiding a systemic crisis in 2008. However for European

manufacturing the new Horizon 2020 provides attractive opportunities for research and innovation grants. Almost 80 billion euros available for different research activities and levels provide highly innovative European machine tool builders grants to intensify their research and development activities .

When grants and state aid are strictly limited by the EU and WTO rules then European public financial instruments, like guarantees, loans or risk capital, include more flexibility. They are well-tested, efficient and effective way of supporting growth, jobs and innovation. Under Horizon 2020 European Investment Bank Group in cooperation with the European Commission launched a joint initiative InnovFin – EU Finance for Innovators. Those financing tools cover a wide range of loans and guarantees which can be tailored to innovators' needs. Financing is either provided directly or via a financial intermediary. The EU lags behind its global competitors in terms of both private and public investment in research and innovation and EIB aims to reduce this gap.

Private financing in transition

The most important source of financial means for the SMEs remains bank loans. Both Association for Financial Markets in Europe (AFME) in its report on "Unlocking funding for European investment and growth" and European machine tool industry confirm that it has become more difficult to get a loan. Banks are more stringent and there is increasing formality and need for documentation.

More than machine tool companies the credit constraints affect the customers of the sector. Despite recovering economy, manufacturing companies keep their investments plans on hold due to credit restrictions or the cost of loan. But the entrepreneurial mind of the sector looks here for solutions. In 2014 leading machine tool builder Trumpf reorganised its leasing arm to a bank with full banking license, TRUMPF Financial Services GmbH.

We see EU Research and Innovation programmes as a good tool to enhance relations with and collaborate with complementary companies, to acquire valuable know-how and to increase R&D funding.

Antxón López Usoz, Innovation & Development Manager, Danobatgroup.



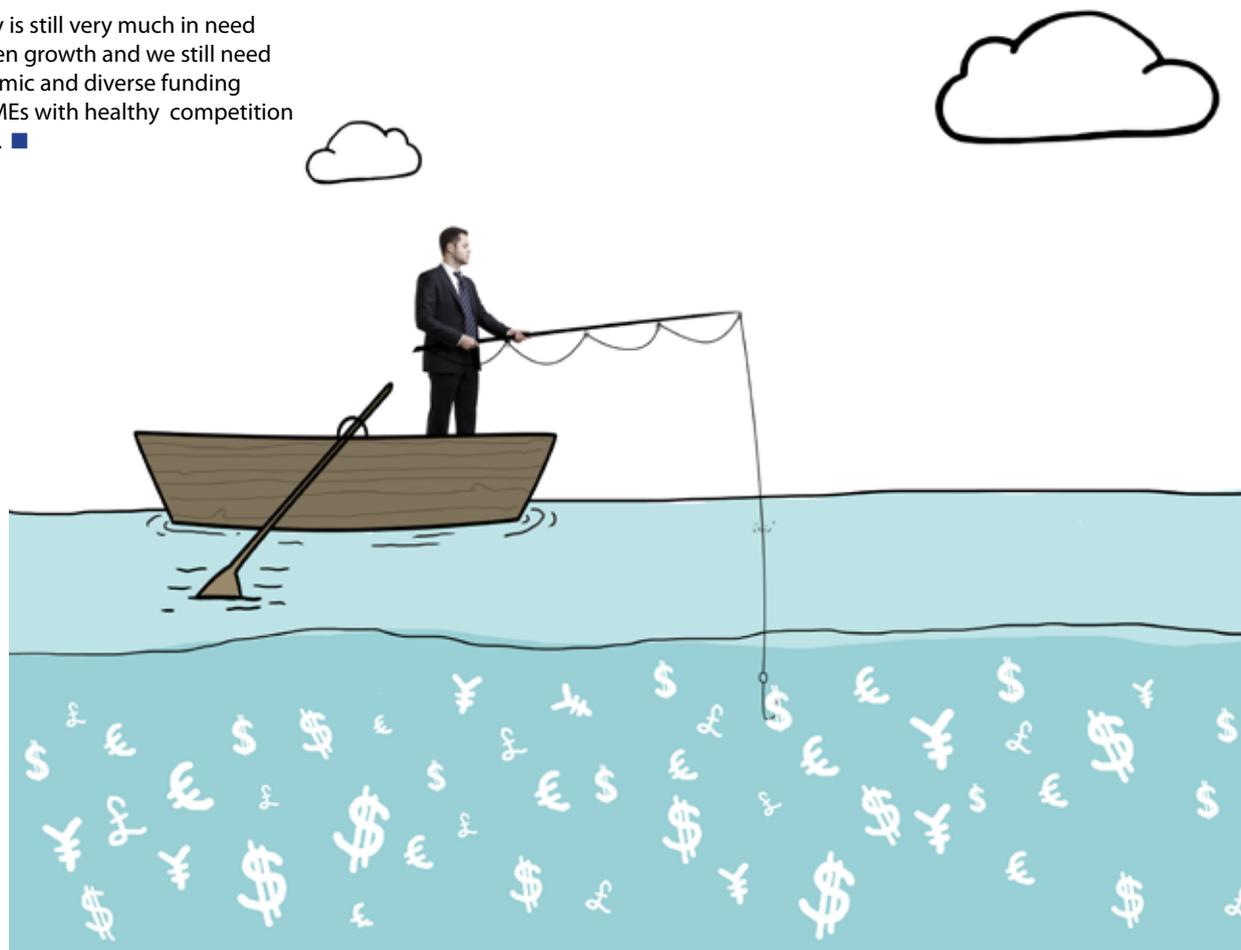
For countries where the bank lending is severely restricted, alternative financing sources can provide necessary relief for manufacturers. When bringing a company on stock exchange is an option for bigger companies then countries have looked also for opportunities for smaller ones. Italy amended considerably its corporate bond market rules over the last two years, creating so-called mini-bonds – bonds designed for the needs of unlisted SMEs. Development of an efficient corporate bond market allows firms to satisfy their financing needs and would give them an alternative to consider. At the same time the mini-bond scheme gives to institutional investors the opportunity to invest in the production system.

In conclusion

European economy is still very much in need of investment-driven growth and we still need to see a more dynamic and diverse funding environment for SMEs with healthy competition between providers. ■

Today, bank loans are the dominant source of financing for machinery investment. To keep credit conditions favourable, it is essential for the financial sector to understand our industry.

René Panczuk, President of
Dufieux Industrie



TRUMPF bank: a win-win situation for machine tool builders and buyers

Hans-Joachim Dörr, Head Group Sales Financing Department - Managing Director, TRUMPF Financial Services GmbH

In early spring this year, the laser and machine tool manufacturer TRUMPF has become the first company in its sector to found its own bank, complete with all competencies.

TRUMPF

The engineering industry has been and still is one of the most important elements of the European economy. Stuttgart and its surrounding region does not host only big automotive companies but also TRUMPF, a high-tech company that focuses on manufacturing technology and laser technology. Employing almost 10.000 employees, TRUMPF provides machine tools for top-quality metalworking. Small and medium-size companies represent a significant share of the company's customers. These enterprises produce standardized metal parts as well as complex machines and have high requirements for precise metal parts. For a high percentage of our customers, a new TRUMPF machine is a significant investment. TRUMPF has therefore been offering, since 2001, leasing solutions to its customers via a fully owned German leasing company with international cooperation. Since 2008, we started a second international operating leasing company, TRUMPF Finance (Schweiz) AG based in Switzerland.

to understand our customers' needs but being part of this industry, we know exactly when the ups and downs occur in the business of our customers. TRUMPF knows the value of its machines and, even more importantly, we know about the projects behind the machine purchase. These facts allow the newly founded bank to offer flexible solutions that make it possible for TRUMPF's customers to adjust to the market. The most important part for TRUMPF and consequently for the TRUMPF bank is to have satisfied customers who, not only today but also in the future, are able and willing to buy TRUMPF machines. And the TRUMPF bank is part of the solution to achieve this goal.

The biggest advantage of our bank is we know our customers, we know the machines that we finance and the projects behind it.

In 2009, TRUMPF and TRUMPF's customers learned an important lesson. Due to the economic crisis and the credit crunch, banks all over Europe lost trust in their customers when they had a hard time to pay their debt. Companies who wanted to invest in the future by purchasing a new machine found themselves unable to obtain/secure loans. This led to a significant drop in the sales of TRUMPF machines. Even after our customers regained confidence in the future, many of them didn't receive the support that they were expecting to receive from their bank.

Therefore, if TRUMPF wanted to sell machines at that time, offering financing solutions to customers was a pre-requisite and it still is the case today. At the same time, in the last years, the European market has become more and more important for TRUMPF. And, we felt compelled to offer finance to customers all over Europe. The foundation of a bank by TRUMPF in 2014 was only a logical step towards achieving this objective.

For our customers as well as for TRUMPF, this bank has several advantages. Not only we claim

The economic crisis has shown that the support of the regular banks to our customers has come to an end too early when times started getting tough, and this is where we can play a role. We know our customers, we know the machine for which we offer finance and the projects beyond. – No one else but the TRUMPF bank has the full overview of these three important aspects. The success of the TRUMPF bank proves that we made the right decision. For the banking industry, it is not enough anymore to only know their customers. The demands of customers make it necessary for banks to take a closer look at the business case they are asked to finance. However, banks don't seem to have found by now a solution that enables the fulfilment of this requirement. ■



The machine tool industry prepares to leverage on additive manufacturing

During the last Annual General Assembly held in Prague on June 24, CECIMO members shared their interests for additive manufacturing and the related impacts on the machine tools sector. Additive manufacturing for metallic based applications will be in CECIMO's radar screen in the coming years.

The origin of additive manufacturing
Commonly known as 3D Printing – a definition which applies more to the consumers' market related printers than to industrial applications – Additive manufacturing (AM) is the official industry standard term for all applications of the technology. It is defined as the "process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies."¹

Additive manufacturing: the general manufacturing process
AM technologies were developed as a result of improvements in different sectors. Improvements in computing power and reduction in mass storage costs paved the way for processing large amounts of data which is typical to modern 3D Computer-Aided Design (CAD). A CAD based 3D model is the common starting phase of all AM processes and allows the possibility of mass customization which refers to a single product produced in low quantities but at a cost-effective price.

Additive manufacturing systems for metal parts are enjoying a strong development worldwide.

AM is not a new technology and its birth is traditionally traced back to the 1980s, when Chuck Hull started experimenting Stereolithography (SLA) - one of Vat Photopolymerization processes - , filled the US patent 4,575,330 (1984) and founded 3D Systems (1986) which is still one of the most innovative high growth companies today.²

For the last three decades, STL (Stereolithography file format), created by 3D Systems has been the industry standard for transferring information between design programs and AM equipment. However, STL format can describe only the surface geometry of a three-dimensional object without any representation of colour, texture or other common CAD model attributes. Since 2012 a new format (the AMF Format)³ has been developed so as to overcome STL limitations. The STL/AMF file describes the external closed surfaces

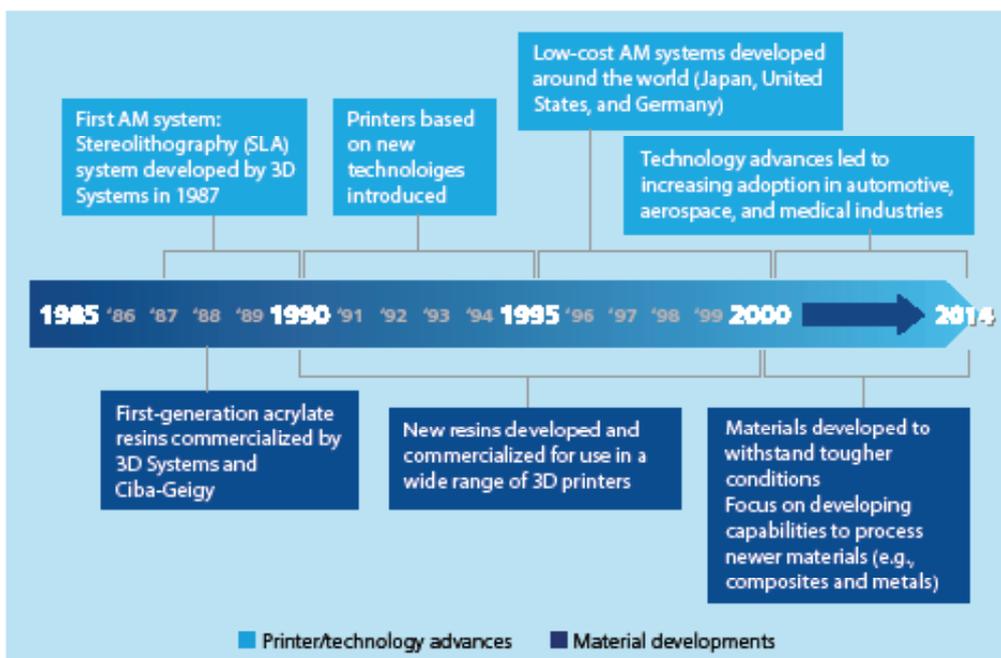


Figure 1 – The milestones of AM
Sources: DU Press, Wohlers Associates



Figure 2 – The AM standard process
Source: DU Press

INDUSTRIES	CURRENT APPLICATIONS	POTENTIAL FUTURE APPLICATIONS
COMMERCIAL AEROSPACE AND DEFENSE¹⁷	<ul style="list-style-type: none"> • Concept modeling and prototyping • Structural and non-structural production parts • Low-volume replacement parts 	<ul style="list-style-type: none"> • Embedding additively manufactured electronics directly on parts • Complex engine parts • Aircraft wing components • Other structural aircraft components
SPACE	<ul style="list-style-type: none"> • Specialized parts for space exploration • Structures using light-weight, high-strength materials 	<ul style="list-style-type: none"> • On-demand parts/spares in space • Large structures directly created in space, thus circumventing launch vehicle size limitations
AUTOMOTIVE¹⁸	<ul style="list-style-type: none"> • Rapid prototyping and manufacturing of end-use auto parts • Parts and assemblies for antique cars and racecars • Quick production of parts or entire 	<ul style="list-style-type: none"> • Sophisticated auto components • Auto components designed through crowdsourcing
HEALTH CARE¹⁹	<ul style="list-style-type: none"> • Prostheses and implants • Medical instruments and models • Hearing aids and dental implants 	<ul style="list-style-type: none"> • Developing organs for transplants • Large-scale pharmaceutical production • Developing human tissues for regenerative therapies
CONSUMER PRODUCTS/RETAIL	<ul style="list-style-type: none"> • Rapid prototyping • Creating and testing design iterations • Customized jewelry and watches • Limited product customization 	<ul style="list-style-type: none"> • Co-designing and creating with customers • Customized living spaces • Growing mass customization of consumer products

Figure 3 – AM Applications by main markets
(Source: Deloitte Analysis; CSC, 3D Printing and the future of Manufacturing, 2012)

of the original CAD model and forms the basis for calculation of the “slices” transferred to the machine, which represent the third phase.

The fourth step in the table below refers to the effective manufacturing and includes the AM machine setup, the building and the removal of the product, which will then finally require post processing (such as polishing) and adaptation to the final use.

Hybrid machine tools that incorporate CNC and AM could represent the next step for the development of the industry.

Two key components to consider: technologies and materials

Numerous technologies have been developed for AM. Originally conceived for producing plastic prototypes using a point-wise laser scanning technique, Powder Bed Fusion process – and specifically Selective Laser Sintering (SLS) – was among the first to be commercialized and represents today the leading technology for metal parts⁴. AM systems for metal parts are enjoying a strong development worldwide, according to Wohlers Report 2014⁵. : 348 of machines were sold in 2013, compared to 198 in 2012, which represents a remarkable 75.8% growth year-on-year.

Other key technologies relevant for Metal AM are Directed Energy Deposition, Sheet Lamination and Binder jetting.

Additive Manufacturing applications

It is however in terms of applications develop-

ment that AM technologies are representing a growing interest for the machine tool sector. In fact, while up to few years ago AM was mainly focused on prototyping, applications are now moving towards mass customized production, specifically in aerospace, automotive, defense, healthcare and consumer products.

Additive Manufacturing opportunities and challenges

The main AM opportunities lie in the design flexibility and in mass customization, process sustainability and rapid product development while the challenges are related to intellectual property protection, standards certification, mass production applications, regulatory issues and - at the moment - limited scalability. Hybrid machine tools that incorporate CNC and AM could represent the next step for the development of the industry⁶.

CECIMO Additive Manufacturing Working Group

Tasks

As of September 2014, CECIMO established an Additive Manufacturing desk in its Brussels Headquarters with specific tasks as to:

- help positioning CECIMO as a point of reference in the area of metallic based 3D Printing vis-à-vis EU policy-makers.
- leverage on metallic based 3D Printing to further improve the image of the machine tool industry and highlight its role as a key enabling (future-looking) technology.
- help increase the awareness of the MT industry on latest developments on metallic based additive manufacturing.
- establish successful cooperation between

CECIMO and actors of the metallic based AM value chain, public authorities, academia, research community and standardization bodies in Europe and be a visible partner in metallic based AM.

Next Steps

Numerous CECIMO members have already designated their AM expert and CECIMO will organize the first AM Working Group meeting in Brussels on November 25th, 2014.

Other already confirmed actions are:

- A dedicated section on the CECIMO website (www.cecimo.eu/additivemanufacturing) offering to CECIMO members the possibility to present and promote their activities in the field of AM, and to receive constant updates on latest developments at European and international level
- Contacts and present evaluation of CECIMO participation in standardization bodies on AM related standards
- Evaluation of European projects related to advanced manufacturing and specifically to AM pertaining to the MT sector.
- Special "AM edition" of the CECIMO Magazine to be published in early 2015
- Organization of an AM roundtable for CECIMO members at the European Parliament in 2015
- Establishment of partnerships with think-tanks and management consultancies so as to provide CECIMO members with information on the latest developments/opportunities in the sector
- Partnerships between CECIMO and AM related events such as the "3D printing event" in Eindhoven (NL) on 21 October 2014 on and the attendance in the BIMU AM Event on 1 October 2014.
- Strong focus at EMO 2015 on AM technologies ■

References

¹ www.astm.org/Standards/F2792.htm

² www.forbes.com/growth-companies/list/

³ www.astm.org/Standards/ISOASTM52915.htm

⁴ Sintering indicates the fusion of powder particles without melting (i.e., in their "solid state") at high temperatures.

⁵ Wohlers Report 2014. "Part 4: Industry Growth"

⁶ www.sme.org/MEMagazine/Article.aspx?id=80776&taxid=1426, <http://3dprintingindustry.com/2014/07/15/hurco-files-patent-hybrid-cnc-based-3d-printing/>

Contacts

For further information and participation, please contact Giorgio Magistrelli, CECIMO AM Project Manager at additivemanufacturing@cecimo.eu

The CECIMO Statistical Toolbox: Forecast the future

Updated monthly, this statistical toolbox aims to help companies forecast their activity based on macro-economic cycles. A series of macro-economic and financial indicators that are benchmarked to the quarterly machine tool orders in 8 CECIMO countries provides an overview of the performance metrics of the European Machine Tool sector. Do not miss out on the unique CECIMO Business Climate Barometer published quarterly.



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Business Climate Barometer

Keep up to date with machine tool business cycles, download your free statistical toolbox on www.cecimo.eu

CECIMO tackles the skills challenge



EuroSkills 2014

From 2 to 4 October 2014, CECIMO participated in EuroSkills 2014 in Lille, France, which is the largest European skills competition. During three days, 450 young skilled workers from 25 European countries competed in 41 skills categories. EuroSkills 2014 also provided the platform for various organizations from industry and the education world to meet and exchange views. Along with other associations and companies from the manufacturing sector, CECIMO, supported by its French member association SYMOP, presented an exhibition booth at the event. CECIMO informed hundreds of young and motivated students, professionals, parents and teachers from across Europe about the machine tool industry as well as the rewarding career opportunities it offers.

The European machine tool industry is an innovative high-tech industry so the availability of up-to-date skills is essential to maintain the sector's competitiveness and sustainability. Showcasing skills in the context of a competition is a good way to catch young people's interest in promising but not well-known trades, such as the machine tool sector. Filip Geerts, CECIMO Director General, said: "EuroSkills is an excellent opportunity for us to communicate the career opportunities offered by the machine tool sector. From apprentices to postgraduate students, everyone can find excellent and challenging career opportunities in European machine tool companies. They will have the chance to develop innovative and sustainable solutions to meet the changing demands of customer sectors such as automotive, aerospace or energy".

The competitions were held in various sectors, and national teams from across Europe competed in several areas related to machine

tools including "CNC Milling" and "Mechanical Engineering Design-CAD". Andrew Beel from the Team UK, who works for Pacson Valves and attends New College Lanarkshire, competed in Mechanical Engineering Design-CAD and won the first place. He said: "To have won a gold medal is just amazing. It still hasn't really sunk in. The competition was tough but I have learnt so much over the last three days. I hope my success will show others just how far you can go in your chosen skill."

The French company HURON, the business partner for CNC milling, provided four machines VX Type 8 that were used by the competitors. "We believe it is highly important to encourage and support youth from dual education or apprenticeship programs. We currently have ten apprentices at HURON", says Dominique Lutz, sales director. "Today's young people are tomorrow's engineers and leaders. France needs skills and must maintain its know-how. Through youth's innovation and intelligence, we must transmit this know-how, bring it to life and make it evolve. For that reason, it is with no hesitation that we are EuroSkills' partner to promote mechanical trades."

Erasmus+

Launch of NAMA - Numeracy for Advanced Manufacturing Erasmus+ Project

In September 2014, CECIMO and its partners across Europe launched the NAMA project, a new Erasmus+ initiative aiming at improving numeracy skills of students and young professionals in the machine tool sector. High technical requirements, coupled with the rapid pace of innovation in machine tools, make mastery of these skills an absolute necessity both for machine tool builders and users. Therefore, European machine tool builders have traditionally been a heavyweight investor in STEM skills and training.

The NAMA Project is expected to provide young people with a common platform at European level to boost their maths skills. The project's first task will be to conduct a detailed analysis of the numerical skill needs of the European advanced manufacturing sector. The two-year strategic partnership project NAMA will also develop EU-level policy recommendations on advancing numerical understanding and skills of students and young professionals.

Alison Bettac, Director of Training at the AMRC Training Center, says: "The University of Sheffield and the AMRC Training Centre are pleased to be a part of the NAMA project as this will enable individuals that work in the advanced manufacturing sector to benchmark and develop numerical skills that are required to meet the challenges of the sector. In addition, materials from this project may also be used within the education community that feeds the advanced manufacturing sector, and will help set the bar for numerical skills required to enter the sector." ■

Awarded Best in Mechanical Engineering CAD at EuroSkills 2014: From Team UK Andrew Beel, here with his training manager Barry Skea



Why is the machine tool sector right for you?

- ✓ You study Science, Technology, Engineering and Mathematics (STEM) related degrees.
- ✓ You are willing to tackle great challenges such as climate change, ageing or mobility by developing innovative solutions.
- ✓ You want to combine your studies with practical experience.
- ✓ You have good communication skills and would like to pursue an international career.



Be ready to take up the challenge!

The machine tool industry...

...is a strategic sector:



Machine tools enable the production of other machines and products covered by mechanical engineering: from cars to planes, from wind turbines to satellites, and from solar panels to computers and to medical devices. They are literally building the future of the world.

...is a high-technology sector:



To build and operate machine tools, deep knowledge and practical skills in mechanical design, hydraulics, electrical design, software engineering, precision engineering, NC programming and other disciplines are required.

...tackles great challenges:



The machine tool industry plays an important role in the development of new products addressing grand societal challenges such as mobility and ageing society. Light-weight planes, microchips, medical implants and electric cars were developed thanks to machine tools.

...is an eco-friendly sector:



The machine tool industry provides customer sectors such as the automotive, aerospace and energy generation industries with innovative solutions to reduce the energy and material consumption of production processes.

...is a globalised sector:



Machine tools help developing countries to complete their industrialization process. By exporting the products to these emerging markets, European machine tool companies directly and indirectly create thousands of jobs all around the world.

Did you know that:

The advanced manufacturing sector, including the machine tool industry, will **double in size** by 2020!

The number of jobs requiring highly-skilled workforce in digital techniques, computing, machine ergonomics and manufacturing methodologies will **↑ 21%** by 2025 in the EU!

A university STEM degree will allow you to earn approximately **30% more** than the average person with a university degree.

The number of people employed as physics, mathematic and engineering **x4** professionals is expected to grow above the average growth!



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Where manufacturing begins

CECIMO is the European Association of the Machine Tool Industries. 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. www.cecimo.eu





EMTE-EASTPO 2014 – Shanghai: a positive outcome!

It's now up to European machine tool builders to tap further into the enormous potential of the Asian market.

With the EMTE-EASTPO machine tool exhibition, CECIMO member national associations wanted to establish a stronger footing in Asia for their member companies, helping them to exploit new markets, and the exhibition's first edition ended on a positive note. Some 650 international manufacturers from 24 countries showcased over four days, from 14 to 17 July 2014, their innovative machinery to buyers from 54 states at the Shanghai New International Expo Centre.

The EMTE-EASPO exhibition, product of the joint efforts of CECIMO, EASTPO Culture and Development and MP International, offered machine tool buyers and builders a European-quality exhibition. James Chia, Chairman of MP International, commented: "We are happy to have reached the European quality level with this exhibition, 85% of the visitors were happy or very happy of its quality." The four-day exhibition attracted 47,654 visitors, mostly from China. The majority of international buyers came from India, Japan, Korea or Southeast Asia.

A unique networking and knowledge-sharing platform

EMTE-EASTPO 2014 offered multiple opportunities for networking and knowledge sharing including seminars and workshops. One highlight was the unprecedented EMTE-EASTPO CEO Summit. Held on 15 July at the Kerry Hotel Pudong Shanghai, the summit's participants

perfected their knowledge and exchanged ideas with a panel of high-level speakers led by keynote presenter Dr. Fritz Klocke, professor and director of laboratory for machine tools and production engineering (WZL) of RWTH Aachen University (Germany) under the theme "Profitable growth through state-of-the-art manufacturing". (See next article)

Right after the event, Filip Geerts, Director General of CECIMO, said: "We are privileged to have the presence of many machine tool experts and leading industry end-users from both East and West in one place to discuss important issues related to manufacturing. We hope that the discussions initiated at the summit will spur greater cooperation between machine tool makers and users."

Knowledge-sharing events also included, among others, a dialogue on "Robotics and metal processing machine tool technology integration and application" and a first summit on the EU-China machine tool industry capital and technical cooperation were well received by exhibitors and representatives of the industry.

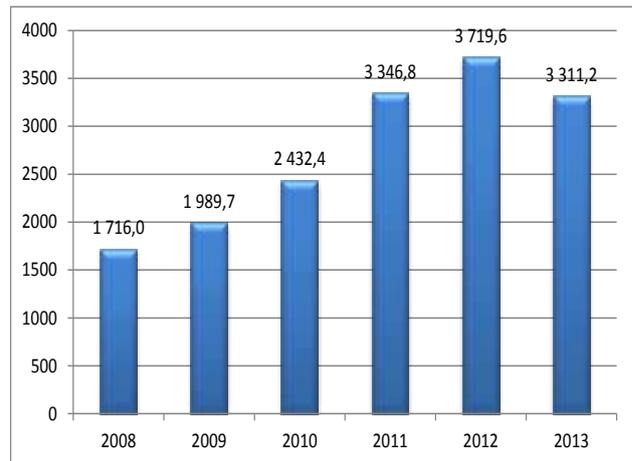
China: a thriving market for European machine tools

Specialized in top-end, highly advanced manufacturing equipment, European machine tool builders enjoy a leading position among China's suppliers. In 2013, Chinese imports from CECIMO

countries recorded over 3.3 billion euros and 41% of all machine tools imported into China originated from a CECIMO country. (see table right)

China is the most important export market for European machine tool builders. Almost one third of the total non-European sales of CECIMO countries in 2013 was shipped to China. The country's encouraging growth forecasts and its expanding middle class (leading to an increase in the per-capita spending in manufactured goods and services) predict further increases in the demand for advanced machine tools, which further stresses the importance of tight relations between China and CECIMO. Other factors indicating that machine tools are ought to maintain or gain importance on the Chinese market include the growing Chinese labour costs, making the automation of manufacturing processes more interesting, as well as the increasing weight of the environmental requirements the Chinese companies must meet. ■

CECIMO exports to China, in billion euros



What European Machine tool builders had to say about it:



Frank Brinken, Chairman, Economic Committee of CECIMO and CEO of Starrag Group Holding AG remarked at the opening of the joint exhibition: "We are very pleased with the outcome of our maiden efforts to stage the first EMTE- EASTPO exhibition - a high quality showcase of innovative technology and practical solutions presented by leading names from around the world."

Tomas Hedenborg, Group CEO of Fastems, said: "This is the first time Fastems participated in an exhibition in China. We had quality business discussions with buyers and even concluded a sale during the exhibition. It was a rewarding experience for Fastems and we will participate in the next exhibition."



In the same spirit, Chris Schmidt, Managing director of Whizcut, adds: "WhizCut had a great show. The contacts we received are now leading to a lot of good business."



Port of Shanghai

An American viewpoint:

Three takeaways from EMTE-EASTPO and the CEO summit

Richard G. Kline
President, Gardner Business Media



I have been visiting China since the early 1980's and have noticed many changes in that country over the years. That said, the recent EMTE-EASTPO CEO Summit held in conjunction with the Shanghai Machine Tool Exhibition left me with a better understanding of the following three drivers of current Chinese change:

Recognition in manufacturing of the need for automation, productivity and quality. China's private and state-owned companies recognize that they not only compete with each other in their domestic market, but they also face increasing global competition. As a result, they must manufacture world-class products in order to succeed at exporting their goods. Chinese labor rates are rapidly rising, so manufacturers are increasingly utilizing automation not only for labor savings, but to improve product quality by removing human error from their processes. Similarly, the Chinese are willing adapters of latest technology in controls, cutting tools and accessories such as those on display at the trade fair. During the Summit, there was extended discussion about shopfloor control and healthy interest in the U.S. MTConnect communications protocol for CNC machines and other manufacturing equipment as well as Germany's Industry 4.0 "smart factory" initiative. Although the two approaches are different, they are both designed to help companies better understand and control

their manufacturing processes while eliminating inefficient, wasteful practices.

It's clear that China is moving from a command to a demand economy.

Willingness to buy foreign brands. At the trade fair, many machine tool builders from various countries exhibited with a lot of buyer interest. This isn't surprising because whether it is machine tools, automobiles or soft goods, Chinese consumers are very aware of brand reputation. Shanghai, home of EMTE-EASTPO, probably has more General Motors Buicks than any city in the world, and more Volkswagens than Buicks. Plenty of high-end auto brands are also visible, including Audi, BMW and Lexus. During the Summit, Sancha Garcia, executive vice president and head of purchasing for Volkswagen Group China, said that automobile sales in China are likely to increase from approximately 16 million this year to 25 to 30 million by 2020. In addition, high-end consumer goods are widely available in Shanghai's famous Bund area with its gleaming new shopping centers. There also seems to be a Starbucks and McDonalds on nearly every street corner, and almost everyone in the bustling city has a smartphone. ▶▶

Rick Kline with the editors of Modern Machine Shop magazine. From left to right: Travis Egan, Emily Probst, RICK KLINE, Derek Korn and Kent Luciano





Need for harmonization of infrastructure growth and sustainability.

Increasingly, China appears to recognize that infrastructure growth must be tempered by concerns regarding air and water pollution as well as energy conservation. Time will tell how effective the country will be in managing these inherent developmental side-effects. There still is overbuilding in certain areas of the country and a lack of effective control of some inefficiencies, too.

It's clear that China is moving from a command to a demand economy, but this transition has not been without difficulties. There are still abuses, and some individuals continue to take advantage of opportunities to make more money or to attain more power. However, I know from firsthand observation that China has made tremendous progress since I first visited three decades ago. Shanghai is a world-class city that any country would be proud to call its own. My recent visit there reinforced the notion that China offers great opportunities for companies willing to learn, work hard and adapt to Chinese culture. ■

The glass is half full (but filling up...)

Franc Kaiser, Partner & Dr. Robert Zhang, Senior Manager, InterChina Consulting

China buys more machines – and leapfrogs into automated solutions

A survey by HSBC conducted in June 2014 showed China's manufacturing activity reached its highest level since December 2013. Compared to China's slowing GDP, this came as a positive sign.

But can such indicators be trusted? At the beginning of this year, the market picture was muddled. 2009 to 2011 were years of strong demand for machinery, but orders dragged in 2012 and failed to recover in 2013. We wanted to know what the market had in store for the second half of 2014 and beyond. In other words, is the glass half full or half empty?

Private SMEs are leapfrogging directly from labor-based factories to cutting-edge automated factories.

In addition to close bilateral contacts with global machine tool makers, InterChina co-hosted roundtable events in February and June of 2014. By working with production equipment vendors selling to China, we have observed signs of promising development.

In February, we learned that the machinery market was still sluggish. Players began to accept a year where replacements drove orders and government stimuli-backed purchases dwindled.

They also prepared for a more competitive environment.

We also learned that state-owned enterprises (SEOs) were postponing their orders indefinitely. "All the specs and tenders for the projects were completed late last year, but we are still awaiting our customer's decision," a European machine tool maker told us, "we simply don't know if the SEOs will purchase... we are getting very nervous for this year now."

At the same time, despite a weaker market, technology and quality requirements appeared to be on the rise. "Customers are asking for more difficult applications and upgrades than before," a tooling maker told us. We also saw international machine tool players land orders with local customers who previously did not exist in the market. "More local customers want to reduce their labor requirements and improve efficiency," another European machine tool maker told us.

From the responses in our June roundtable discussion, optimism appears to be returning to the mix. Although there was no exceptional order activity, May and June performances, and the outlook for the rest of the year, are decidedly more positive. All players we talked to believe 2014 will

be stronger than 2013, with sales expected to increase 15-20%.

The most important demand drivers are the automotive and automotive component sectors. Machinery players in these sectors, particularly private auto component makers, continue to perform well, driven by overall growth in the automotive sector. Some players suspect electric vehicles and tougher emissions standards are additional drivers. "We expect this sector to grow and keep providing opportunities for machinery orders over the next five years," was the canon of all players we discussed with. As such, automotive remains a reliable constant for China's machine tool makers.

Major production equipment vendors selling in China expect 15-20% increase in their sales compared to 2013.

But machine sales may only be one side of the coin, players offering robotics and automation solutions are expecting extraordinary sales growth this year and beyond. "The demand for automation and semi-automated solutions is staggering... smaller private factories are ad-

ressing unstable labor and operator issues now," a robot maker told us, "smaller private companies have to trim their processes, and they are leapfrogging directly from labor-based factories to cutting-edge automated factories."

Across all customer sectors, the expectation for the remainder of 2014 is increasingly positive. "While 2014 may be a lukewarm year, we are actually optimistic about the years to come."

So, is it business as usual? We believe not, as several companies are already starting to adjust their short-term strategies. "We cannot simply wait. The market is changing as we speak. Private customers want better and cheaper solutions," a European player said. To gain the upper hand, many companies are honing their China sales skills. "We still need more market penetration and better coverage, and we need additional dealers and salesmen to manage this process." With more customers, the challenge of providing good, reliable services also reaches a new level. "Services are going to be key in China," an international machine tool maker shared with us, emphasizing that foreign players need to keep investing in customer support to help explain financing options and offer process improvement solutions. ■




BLUECOMPETENCE
Machine Toolsoperated by **cecimo**

Blue Competence Machine Tools: celebrating new Swiss members

Sustainability is one of today's most challenging issues. Many manufacturers look for new ways of reducing energy- and resource-consumption of their production processes and products to remain competitive and to offer maximum value to their customers. To help the European machine tool industry tackle this challenge through a common platform, CECIMO has been operating the Blue Competence Machine Tools initiative at European level since 2012.

In the last two years, more than 60 organizations from the European machine tool industry including national associations, companies and research institutes have joined the initiative and have federated efforts towards common sustainability goals in Europe. That makes the European machine tool industry a pioneer among other sectors when it comes to sustainability. Since its launch, the voluntary market-based initiative has proved its capacity to help member companies communicate their energy- and resource-efficiency solutions through transparent criteria and let their customers make informed procurement choices.

A growing membership base in Switzerland

Along with other mechanical and electrical engineering sectors, SWISSMEM helps Swiss machine tool companies to stay competitive and to establish an international market presence and visibility. The Blue Competence initiative is one of the tools available to help fulfill this mission. SWISSMEM has been actively promoting the initiative in Switzerland and two Swiss companies have recently become Alliance Members, namely Georg Fischer Machining Solutions AG (GF MS), as a group, and Fehlmann AG. Mr. Christoph Blättler, Secretary General at SWISSMEM – Machine Tool Manufacturers, says: “The Swiss machine tools industry is quite export oriented and we have to make sure the breakthrough technologies and sustainability solutions generated by our companies are effectively and transparently communicated to buyers and other stakeholders at international level. Thanks to its global recognition, Blue Competence is the ideal platform to achieve this challenging goal.”

At the cutting edge of sustainable production solutions

GF MS is the world's leading provider of machines, automation solutions and services to the tool and mold making industry and to manufacturers of precision components. The company regards its industrial, environmental and social commitment as a long-term undertaking. Its aim is to be a preferred partner for all dialogue groups and to stand out for its responsible,

“By joining the Blue Competence initiative, we declare our commitment to delivering cutting-edge innovations that promote energy- and resource-efficiency”;
Harald Küchler, Georg Fischer Machining Solutions

sustainability-conscious behaviour and continuity. All the divisions of GF MS contribute, through their products and solutions, to increasing energy efficiency in operations and to lowering energy consumption. As far as environmental targets are concerned, GF MS focuses on the improvement of energy efficiency and the reduction of waste in production, increasing the energy efficiency of its products, machine precision, efficiency and reliability altogether and trends toward miniaturization and saving resources remain strong. In that regard, the Corporate Group invested CHF 48 million in research & development in 2013. Harald Küchler, Division Quality System & Sustainability Manager at GF MS, states: “By joining the Blue Competence initiative, we declare our commitment to delivering cutting-edge technological and technical innovations that promote energy- ▶▶

and resource-efficiency. The initiative highlights our willingness to support the European machine tool industry in tackling the sustainability challenges facing our society”.

***Being a Blue Competence Alliance Member will help us effectively communicate our innovative and sustainable solutions.
Franz Wildhaber, Fehlmann AG***

Fehlmann AG, a family-owned company, specializes in developing and manufacturing precision machine tools for drilling and milling purposes. Franz Wildhaber, Head Electric Development at Fehlmann AG states: “Fehlmann AG is a family business that is ready to face future sustainability challenges. We are proud of our long tradition of environmental awareness and being a Blue Competence Alliance Member will help us effectively communicate our innovative and sustainable solutions”. Fehlmann machines have long had by default an energy-recovery system

which ensures substantial savings in energy and operating costs. For example the machines can be completely switched off after processing the NC programs by means of a simple M function. Furthermore, for years, the company has offered a programmable timer with CNC machines, with which the machine is automatically started up in the morning and an unsupervised warm-up of spindle and axes is enabled. After a program has been executed, the machine goes into sleep mode and restarts by itself all systems the next morning”.

Filip Geerts, Director General at CECIMO, adds: “We are glad to see that the Blue Competence initiative is constantly growing across Europe. The voluntary initiative is a signature contribution of the European machine tool industry towards the EU 2020 strategy which is about delivering smart, sustainable and inclusive growth in Europe”. ■

For further information on the Blue Competence Machine Tools initiative, please visit www.cecimo.eu

Corporate Social Responsibility in the EU

In October 2014, the Council of the EU adopted the amended Directive on disclosure of non-financial and diversity information by certain large companies and groups. Large companies with more than 500 employees will hereafter be required to disclose certain non-financial information in their annual management reports. Approximately 6000 large companies and groups across the EU will be affected.

The online training modules will help with capacity building, especially for SME, thus contributing to their competitiveness.

According to the new Directive, companies concerned will need to disclose information on policies, risks and outcomes as regards environmental matters, social and employee-related aspects, respect for human rights, anti-corruption and bribery issues, and diversity in their board of directors. The European Commission expects that the Directive will generate significant benefits both for individual companies and the society by increasing the awareness of managing environmental and social challenges in an effective and accountable way. It is predicted that reporting will help customers, suppliers and citizens to make informed choices and develop further relations with companies with a positive social and environmental impact.

Being an SME-dominated sector – 80% of European machine tool companies are an SME – the Directive will not affect the European machine tool industry directly. Nevertheless, machine tool builders hold a strategic place in the manufacturing value chain and supply equipment to large European companies from automotive, aerospace, construction equipment, energy generation and other sectors which are covered by the Directive. It is, therefore, expected that machine tool builders will face increasing requirements from clients to provide information and documentation as regards their business and supply chain practices, products and processes.

The European machine tool industry is a key enabling sector which underpins the competitiveness of European manufacturing thanks to the sustainable and innovative production solutions it provides to a wide array of industries. The sector is indeed globally known for its high-performance, and resource- and energy-efficient products which ensure a high level of health and safety in the workplace. In addition to individual company practices, there are already several sectoral initiatives, such as Blue Competence, that communicate companies’ sustainability practices via a common platform to stakeholders. To further prepare the sector for the forthcoming challenges, CECIMO launched the EU-funded DESIGN-MTS project in 2013. The project aims at developing a multi-stakeholder platform in the field of CSR and sustainability for the machine tool sector.



Over the past year, the project consortium has identified areas of relevance in CSR for the machine tool industry and its value chain, namely employability, demographic changes, workplace challenges, environmental sustainability and fair operating practices. The project consortium has mapped challenges and opportunities in each area and has assessed the level of awareness and best practices in the sector. The findings have been disseminated through a series of events as well as on the online project platform. A major objective of the project is to better inform SMEs as regards the fundamental concepts of CSR and related international standards, and to help them better prepare to respond to growing requirements of customers. Therefore, online training modules have recently been launched on the project website, which offer free-of-charge courses to companies and trade associations. "People", "environment" and "fair operating practices" are the core areas that courses focus on.

The online training is expected to increase the CSR knowledge and awareness in the European machine tool sector and to help companies

Compliance with customers' CSR-related requirements increasingly affects machine tool companies' ability win new contracts.

better understand requirements of user industries. The training modules are designed to educate SMEs and help them develop their internal capacity to comply with these standards. Capacity building to this end will therefore help to keep them competitive while generating high value for the society and the environment. Filip Geerts, CECIMO Director General, states: "Compliance with customers' CSR-related requirements have become a matter of competitiveness for machine tool suppliers. It increasingly affects suppliers' ability to keep their customers and to win new contracts". The DESIGN-MTS project offers thereby a useful tool which contributes helping meet the Europe 2020 strategy's objective of smart, sustainable and inclusive growth. ■



Ecodesign legislation for machine tools: institutional developments

Since it first came into effect in 2005, the EU's Ecodesign Directive has required an in-depth analysis of a great range of products' environmental performance. Between 2005 and 2009, the focus was set on the energy using products (EuP) while in 2009, the scope was extended to the energy related products (ErP). The same year, the first Ecodesign Working Plan was introduced and it included machine tools in the indicative list of products which were considered as priorities for the adoption of implementing measures.

Preparatory phase – a glimpse back

The announcement of machine tools in the first Ecodesign Work Plan triggered the first step of the legislative process, namely a preparatory study. The study on the so called Lot 5 - Machine tools and related machinery was contracted to the Fraunhofer Institute. It started in January 2010 and ended in August 2012 with the publication of the final report. The second step was the organisation of a Consultation Forum on Lot 5. However, prior to that, the European Commission (DG Enterprise and Industry) contracted to BIO Intelligence Service a report known as the Impact Assessment Study. This report is being concluded by the consultant at the time of writing, but some of its findings were already presented at the Consultation Forum on Machine Tools that took place in Brussels, in May 2014.

Consultation Forum on Machine Tools

At the meeting in May, the following policy options which would target products covered by Lot 5 were presented: Implementing Measures (IM) for welding equipment and wood working machine tools, a Point Scheme (for stone and ceramic working machine tools, metal-working machine tools), a Self-Regulatory Measure (proposed by CECIMO) that would be an alternative to the Point Scheme and finally, a Good Design Checklist Proposal (for all machine tools). Under the Point Scheme, points would be allocated for specific energy saving measures applied in the machine tool. A threshold would be defined in order to consider a machine tool compliant with the ecodesign measures. In addition to that, a very detailed data set with regards to different energy efficiency solutions and points allocated would have to be developed in order to cover a maximum of possible solutions, if not all. Non-quantifiable energy savings would be covered by the Best Practice Design Checklist but they would be considered as soft measures due to the fact that they cannot be ascribed to energy savings.

Opinions voiced by the stakeholders in the meeting (which included representatives of Member States, industry stakeholders and non-governmental organisations) confirmed that the proposed solutions were not mature enough at this point of the process. The CECIMO SRM (Self-Regulatory Measure) was positively evaluated,

CECIMO's self-regulatory measure proposal received positive feedback from Member States' representatives and other stakeholders.

however, it has been recognized that the following factors will pose a big challenge to the effective implementation of SRM: a lack of market surveillance, a lack of incentives for companies to invest in energy efficiency and free riders (those who do not participate in the SRM).

CECIMO Self-Regulatory Measure in a nutshell

The ErP Directive offers the interested industry a possibility to develop an alternative to the regulatory measures in the form of a Voluntary Agreement. Any industry proposing self-regulation needs to specify the governance structure that will be put in place to secure effective implementation of the ecodesign requirements.

According to the proposal elaborated by the CECIMO's Energy Efficiency Working Group, the SRM will build on two major elements: management by SRM Administration and self-assessment by signatories. It will cover all metal-working MTs especially CNC (cutting and forming) and laser cutting machine tools. The SRM will have to gather at least 80% of the market players. When it comes to product coverage, each signatory to the SRM has to show a compliance rate of 90% for their products, according to the European Commission's guidelines for the voluntary agreements. These guidelines are still under revision and may be subject to changes. The SRM Administration ensures operation of the CECIMO SRM and is in charge of all administrative affairs. It will be an independent body responsible for an overall coordination, data handling, supervision, reporting, communication, promotion of participation, etc.

Voluntary Agreement Guidelines

In the process of establishing CECIMO SRM, the on-going revision of the European Commission's voluntary agreement guidelines need to be taken into account. The latest discussion between the stakeholders and the Commission took place in June this year. The latest draft of the guidelines proposes, for any voluntary agreements under the Ecodesign Directive, a market coverage rate of 80% and a compliance rate of 90% of products of each signatory. The Commission claims that these changes can reduce administrative burden complexity and inspection needs. Moreover, the current proposal suggests that the Commission designates the independent inspector (who will be tasked with monitoring voluntary agreement) to ensure impartiality. The costs, however, would still be borne by signatories. Finally, the proposed guidelines would increase requirements for testing and for greater transparency via the publication of the non-compliant signatories on the public website of the voluntary agreement. At the time of writing, the Guidelines' final version is still awaited. Existing or upcoming voluntary agreements will need to be adapted accordingly.

ISO 14955 series

A crucial element for the successful implementation of ecodesign requirements in the machine tools sector are industry standards. The most relevant work has already been launched on the ISO level under 14995 series. Part 1: Design methodology for energy-efficient machine tools has been published in March this year. Other standards in this series, such as measurement of energy supply and principles for testing for metal cutting and forming machines, are under development and are not expected to be finalized before 2016 or 2017.

The European Commission's impact assessment on machine tools and related machinery is expected to be finalized in early 2015.

Timing

Once the contractor, BIO Intelligence, will finalise the report on the Impact Assessment Study, the Commission will subsequently prepare its own Impact Assessment which is expected to be ready at the beginning of 2015. Finally, the Impact Assessment Board (IAB) of the Commission will decide which options (either voluntary agreements (SRM) and/or the implementing measures) will be devised to regulate various product groups under Lot 5. Any implementing measure would have to go through a few more stages such as the notification of the World Trade Organisation (WTO) and the scrutiny of the European Parliament and the Council. This would lead to finishing the process possibly in 2016. A voluntary agreement, on the other hand, would not require any additional procedural steps and would immediately take effect following the approval of the European Commission. ■



The European Ecodesign family is expanding

The Commission is going ahead with the extension of Ecodesign requirements to new products groups. At the moment, it is preparing the third Ecodesign Work Plan for the 2015-2017 period, suggesting taking under the magnifying glass such product groups as electric kettles, mobile phones and smart phones, tertiary hot beverage equipment, greenhouse covers, building automation systems in non-residential buildings or lifts. The final list is still under preparation but it seems that the ecodesign requirements will keep the whole industry busy in the coming years.

European machine tool trade and expectations from EU trade policy

European machine tool builders run a truly global business. Exports of the European machine tool industry stood above the level of 18 billion euro for three years, which is higher than the previous peak level in 2008. Therefore, the EU trade policy strongly influences the sector.

Good performing exports

The European machine tool industry is truly global. Dominated by SMEs, the European machine tool industry is highly export oriented, shipping almost 80% of its production abroad. After a steep drop in 2009, CECIMO's machine tool exports gathered pace and reached an all time record amounting to 18.8 billion euro in 2012. The rebalancing trend in China towards a more consumption-based economy brought down export flows in 2013 to 18.2 billion euro. Despite the global growth projection of the International Monetary Fund for 2014, this year has been marked down by 0.3 % to 3.4 %, reflecting both the weak first quarter and a less optimistic outlook for several emerging markets. CECIMO expects its exports to increase by 2% to reach 18.6 billion euros.

Stable imports

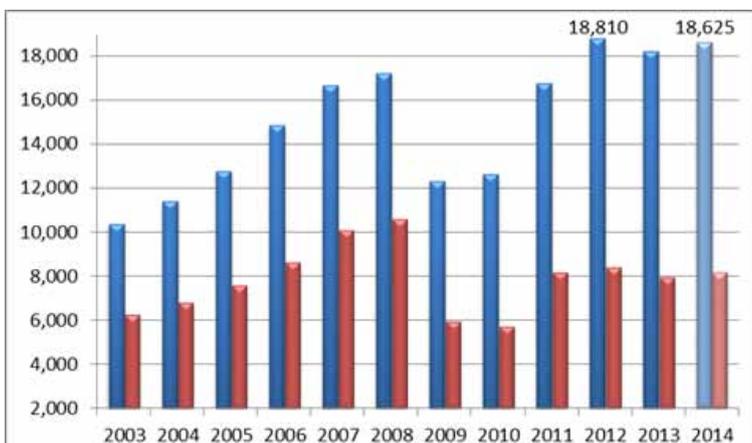
CECIMO import flows reflect a cautious recovery of European manufacturing. In 2013, the European industry imported machine tools worth 7.9 billion euro. This year, we forecast the machine tool imports to increase by 3% and reach 8.2 billion euro.

European machine tools are sought after all over the world. High productivity, precision and state of the art technology make unique selling arguments. The European machine tool industry contributes to the European trade with a strongly positive balance. In 2013 the trade balance came to the level of 10.3 billion euro. As we expect exports to grow quicker than imports, CECIMO forecasts a record trade balance which will equal to 10.5 billion euro for 2014.

Trade partners around the world

It is hard to find any industrialised or industrializing country with which European machine tool builders do not have trade relations. CECIMO exports to and imports from over 200 different countries.

China, the US and Russia are the biggest export markets. CECIMO countries export to those three countries over 50% of the total exports destined to outside CECIMO. The main non-European supplier to CECIMO countries is Japan who accounts almost one third of all machine tools imports.



CECIMO trade 2003-2014, mln euro

CECIMO's main trading partners, 2013

The role of trade policy

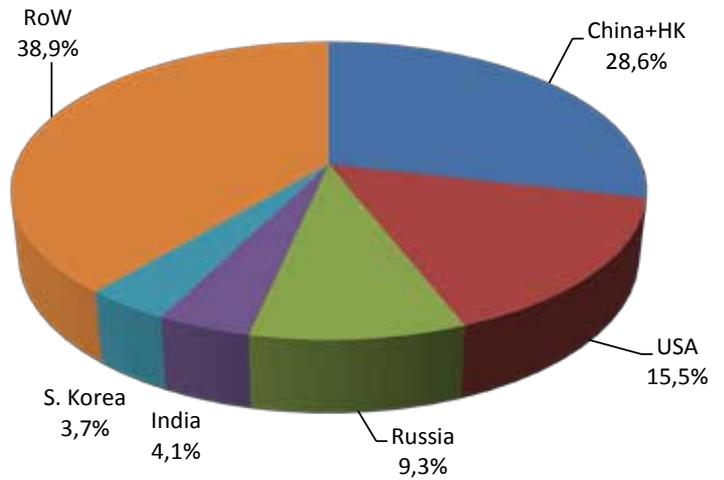
International agreements, both multi- and bilateral, provide an important regulatory framework for international trade. This is especially true for SMEs, which make up more than 80% of the European machine tool industry, for which a predictable and rules-based trade environment plays an important role.

Over the past 60 years, multilateral trade agreements have reduced remarkably the bounded customs tariffs that are now quite low for machine tools and do not form a serious restriction to trade. On the other hand, European machine tools builders are concentrated on advanced technologies where conflicts in product and trade standards may constitute a serious impediment to market access.

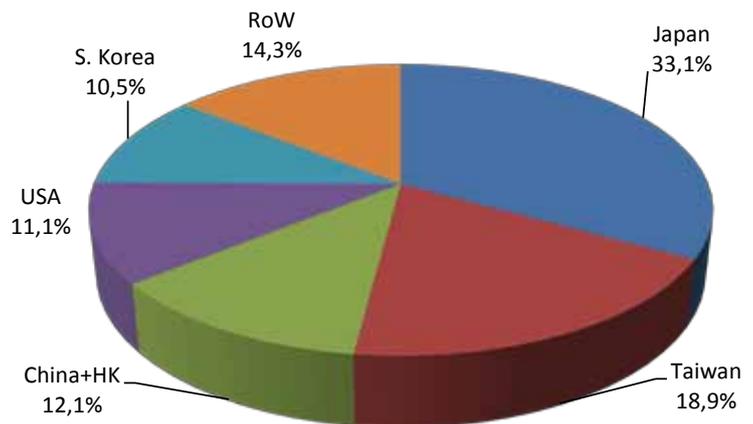
Therefore, the future EU trade policy should concentrate on non-tariff barriers (NTBs). CECIMO considers it essential to increase transparency in the NTBs and, over time, to move towards abolition of such barriers as systematically as possible.



Top customers



Top suppliers



Always recognized for their particular skills that make them able to provide end-users with customized solutions, Italian machine tool manufacturers are third in the international export ranking. However, the exports include considerably high risks. Sound international rules can bring that risk significantly down.

Luigi Galdabini, Managing Director of Cesare Galdabini S.p.A. and Vice President of CECIMO.

Advanced Manufacturing must be a top priority for the new European Commission

Europe has a strong manufacturing base but it is lagging behind major competitors in terms of labour, material and energy costs. Investments in advanced manufacturing capabilities are essential to boost productivity and to optimize resource use whilst increasing industry's innovation potential.

Europe is a global heavy weight in advanced manufacturing technologies. It generates 39% of the global machine tool output and European exports (including intra-EU trade) account for 50% of the world machine tool exports. Europe's share in global patents filed in machine tool technologies is as high as 50%. Europe's strength lies in the supply of advanced production technologies which have thus far underpinned the competitiveness of the entire European manufacturing base. These technologies give the industry significant efficiency and productivity gains and first-mover advantages.

Nevertheless, the figures above should deceive no one. Today European manufacturing, while its globalisation process is well underway, is facing serious challenges. Most importantly, remnants of the economic crisis continue to hurt manufacturing investments in Europe, which hampers productivity and innovation. If Europe wants to secure a competitive industrial future, it needs to propose a comprehensive strategy to free industry from the shackles of the crisis and lead to strong and sustainable development.

Pressing global challenges

In the aftermath of the global financial crisis, we woke up to a new era. Some of the challenges facing Europe's manufacturing industry over the past decade have become more pronounced.

Firstly, competition from low-cost countries is fiercer than before and threatens European manufacturers, especially those competing in volume markets for low-to-medium tech products. Secondly, compared to other advanced economies, Europe has a growing disadvantage in terms of manufacturing costs and has a chronic low productivity problem.

Thirdly, manufacturing industries in some parts of Europe are stuck in a "low investment - low productivity - low growth" trap due to enduring economic uncertainties and problems in accessing to finance. Last but not least, Europe continues to lag behind major economies in innovation expenditure, and this is happening whilst a new wave of technologies, which may revolutionize manufacturing and enable re-industrialisation, is in the pipeline.

Challenges facing European industry over the past decade have become more pronounced after the crisis.

As international competition for manufacturing leadership and for attracting investments is heating up, the cost of no action for Europe may be too high.

Remaining competitive in a high-cost manufacturing location

Low-cost countries, like China, are rapidly upgrading their technological base and improving productivity through investments in advanced automated production systems. At the same time, the US has dramatically reduced its manufacturing cost thanks to shale gas discoveries. According

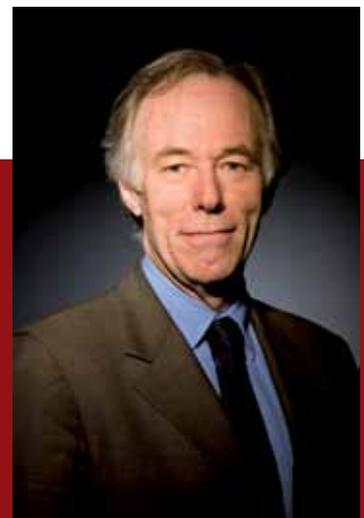
to Boston Consulting Group's Global Manufacturing Cost Competitiveness Index, average manufacturing costs in Germany, France and Italy are around 25% higher than the US and 10 to 15% more expensive than South Korea and Japan.

Average manufacturing costs in the US have come (mainly thanks to shale gas discoveries) to almost parity with China. The US is now a cheaper manufacturing location than eastern European countries like Poland, Slovakia and Czech Republic, where lower labour costs have thus far been a strong advantage. Japan enjoys high productivity rates, a weak currency and the highest expenditure in research and innovation compared to Europe and the US.

How can Europe's manufacturing base survive amidst global competitive pressures? Jean Camille Uring, CECIMO President explains: "The answer is in advanced manufacturing. Investing in advanced manufacturing capabilities can help Europe to compensate high labour costs, to optimize resource use and to unleash the innovation potential of companies." Indeed, new production techniques offer the

Investing in advanced manufacturing capabilities can help Europe to compensate high labour costs and optimize resource use.

Jean Camille Uring,
CECIMO President





possibility to produce complex high value added products which are customized to the needs of societies across world regions and that can be marketed globally. The integration of digital and communication technologies in manufacturing also offers a great potential to streamline operations across the supply chain, from procurement to manufacturing and to distribution. In order to grasp these opportunities, European industry has to make the right investments in a timely manner.

Building a manufacturing society – how far are we?

The European Council of 21 March 2014 stated in its conclusions that “Europe needs a strong and competitive industrial base, in terms of both production and investment, as a key driver for economic growth and jobs”. The Council highlighted that this can be achieved by creating European and national frameworks which are conducive to “innovation, investments and the re-shoring of manufacturing jobs”. Advanced production technologies, namely high performance production, are seen by the EU leaders as the main driver of industrial competitiveness to this end.

The industrial investment level in Europe is EUR 30 billion lower than the level of depreciation.

The Council has, thus, encouraged the European Commission to further pursue its objective to increase the share of manufacturing in EU GDP from the level of 15.1% to 20% by 2020. The Commission was also requested to prepare a roadmap based on its January 2014 Communication “For an

Industrial Renaissance”. The roadmap is expected to become public before the end of 2014 and will be discussed at the European Council meeting in March next year.

Despite the existence of political will to advance manufacturing in Europe, progress is insignificant. The 2014 EU report on Member States’ Competitiveness states that industrial production in the EU remains below the 2008 level while investments remain stubbornly unresponsive to economic reform programmes. According to Eurostat, fixed investments in the EU were measured at 17.5% of GDP as of June 2013 against 21.1 % in 2007. Investment in machinery and equipment - which constitute one third of the overall fixed investment - could not regain the share lost in 2008-2009. CECIMO figures also inform us that European machine tool consumption, after dropping by 40% in 2009, remains today still 30% below the pre-crisis level.

Europe is suffering from a significant investment gap. According to a recent Roland Berger study, the industrial investment level in Europe is EUR 30 billion lower than the level of depreciation, which means that assets are slowly losing value.

Obsolescence of the machinery park – an insidious threat?

Statistics confirm that production plants in Europe are slowly becoming obsolete. According to available fig-

ures, the age of the machinery park in France has increased from 17.4 years in 2008 to 19 years in 2013 and from 18.2 years to 19.1 years in Germany. In both countries, the number of machines which are more than 15 years old has increased in the same period. A machine tool, depending on its type, comes to the end of its life in 15 years on average. Despite a lack of figures, estimations for southern European countries indicate a similar trend. Europe cannot win the global race with obsolete production systems.

A delayed recovery in capital investment could cause the European machinery park to become obsolete.

Europe is also lagging behind major competitors in the adoption of robotics. According to statistics from the International Federation of Robotics, in 2012, South Korea had the highest robot density in the world employing 396 robots for every 10,000 workers. It was followed by Japan and Germany, which recorded figures of 332 and 273 respectively.

Investment in machinery and equipment is a strong indicator of how well businesses can keep up their manufacturing capability over a period of time. In an environment of high labour, energy and material costs and



fierce global competition, upgrading production capabilities is essential for boosting competitiveness. Furthermore, the exploitation of new production technologies, for instance additive manufacturing, offers a great potential for designing products, processes and supply chains from a radically different angle and for discovering new ways of creating value.

Jean Camille Uring, explains the implications of a lack of recovery in capital investments in Europe: *"The probability of any further delay in the recovery of investments in industrial machinery and equipment points to a dangerous trend: declining productivity, reduction in value-added generation and reduction profitability, which leads to the weakening of competitiveness."* According to Mr Uring, the slowdown in demand of new production equipment also negatively affects the ability of the supply side in the long term. Underlining that innovation is driven by customer demand in the machine tool sector, he states: *"If Europe fails to follow technological change, it risks losing out to competitors in the next rounds of innovation."*

Continuing underinvestment calls for EU action

According to the EU Member States' Competitiveness report, manufacturing companies are holding back investments in capital goods due to persisting economic uncertainties. It should also be noted that due to fluctuations in global economy and increasing competition, companies can hardly predict their orders so they stop themselves from making long term investment plans. In European countries affected by the sovereign debt crisis, the difficult access to finance is a major factor hindering investments in advanced production systems. Banks are reported to impose collaterals to SMEs who apply for credits. This reflects the financial sector's enduring lack of trust towards the manufacturing sector.

It actually becomes apparent that external factors which are not linked to the performance of businesses undermine their ability to make competitiveness-enhancing investments. Banks are still interested in the past balance sheets of manufacturing enterprises - reflecting the underperformance of the crisis years - rather than in their business plans and actual growth potential. Meanwhile,

underinvestment in industry threatens growth and jobs in Europe. Taken altogether, such trends point to eventual market failures which need to be further investigated by policy-makers.

Access to finance is a problem, but not the only one

The Task Force for Advanced Manufacturing for Clean Production, launched by the European Commission in late 2013, published a report in March this year about barriers to the adoption of advanced manufacturing technologies. In addition to difficult access to finance, low user awareness, organizational barriers and a lack of internal skills and competences were found to be hold back the transfer of advanced production technologies to industrial users in Europe.

According to some other studies in the field, the availability of manufacturing technology suppliers in a given region also affects industrial users' ability to adopt the latest technologies. This highlights the importance of maintaining a strong suppliers' base in Europe which stays in close interaction with industrial users.

Against this background, it becomes essential to closely study the following questions. How to repair the broken link between the financial sector and the real industry? How to address external factors hindering the industrial users' shift to high performance, automated and flexible production technologies? How to monitor and benchmark the global competitiveness position of SMEs, and how to support them in their efforts to remain at the cutting edge of manufacturing technology?

Ingredients of an effective policy framework

The underinvestment problem is recognized by the European Commission. Already in 2012, European targets were set in the Commission Communication on industrial policy: increasing the share of gross fixed capital formation in the EU GDP from 18.6% in 2011 to levels above 23% by 2020, and increasing the investment in equipment from 6 - 7% of the EU GDP to above 9% by 2020. Progress in the achievement of these targets will be supportive of Europe's efforts to increase the share of manufacturing in the EU GDP to 20%.

Europe needs to focus equally on incremental and breakthrough innovation.

Jarmo Hyvönen, Chairman of CECIMO Communication and Advocacy Committee affirms: *"The new Commission should take these targets seriously and should lay down a European action plan which can mobilize the EU's major policy instruments, such as the structural funds, and the European Investment Bank to unlock productive capital investments."* He adds that the EUR 300 billion investment plan that the new Commission is preparing to propose by the end of the year should place advanced manufacturing investments at its heart. *"This would not only raise the technological level amongst manufacturers and therefore competitiveness, but as well ensure optimized use of energy and higher health and safety conditions."* Mr Hyvönen says. ■

The 300 billion euro investment plan of the new European Commission should place advanced manufacturing at its heart.

Jarmo Hyvönen,
Chairman of CECIMO
Communication and
Advocacy Committee



cecimo has Manufacturing at Heart



Back in April, prior to the European elections, Orgalime, in partnership with CEEMET, launched the follow-up to the industrial policy manifesto ‘Manufacturing a Stronger and Greener Europe’ presented to European Commission President Barroso, with **Manufacturing: the Beating Heart of Europe** (www.manufacturingatheart.eu), a campaign website aimed at decision-makers and other relevant stakeholders.

CECIMO is proud to be a supporter of the campaign.

It serves as an aide-memoire, telling a story of what we believe needs to be done for manufacturing and why everyone needs to fall back in love with it.

This is a call to action. Please give this your widest possible distribution, we invite member companies to register their individual support for the initiative directly on the site, displaying your logo and company name.

Follow too on Twitter ([@MFGatHEART](https://twitter.com/MFGatHEART)) and Facebook

Is Europe's advanced manufacturing industry doomed to be a victim of unfair trading practices?

The centralisation trend in important end-user sectors has led to an imbalance in the bargaining power of suppliers and customers of production equipment. Purchasing terms and conditions are shifting excessive costs and risks on suppliers which may cripple investments and innovation in advanced manufacturing.

Structural changes in supply chains

The machine tool industry sells advanced production equipment and systems to a broad customer base including automotive, aerospace, railway vehicles, construction and mining equipment and oil and gas industries. A typical European machine tool enterprise is a small or medium sized company, generally with low capitalisation, and is often owned by a family. Some consolidations have taken place over the last decade as companies merged to cope with global markets. Nevertheless, SMEs still represent more than 80% of companies within the coverage of CECIMO.

Against this background, the European machine tool industry has seen dramatic changes in its value chain, especially in major customer sectors. For example, the automotive industry, which represents more than 30% of the market share for European machine tool producers, has gone through structural changes: automotive companies have become fewer and bigger. As some companies have seen their market power growing, they have imposed increasingly stringent requirements on upstream suppliers in terms of technical performance as well as delivery, service and warranty conditions.

The centralisation trend in transport vehicles industry resulted in fewer and larger customers.

All of this can be seen as a natural consequence of market restructuring. What worries suppliers of production equipment is the increasing use of unlimited liability clauses in purchasing terms and conditions by customers as part of their risk management strategies. Not limiting the liability of parties in commercial relations may result in significant financial risks for suppliers, threatening their business.

Rule of power or rule of law?

The centralisation trend in customer industries has led to disproportionate growth in their bargaining power vis-à-vis upstream

suppliers. Recently, some original equipment manufacturers (OEMs) have adopted purchasing terms and conditions (T&Cs) that shifted significant risks and responsibilities on small suppliers. In most cases, such T&Cs are unilaterally imposed based on a "sign it or leave it" basis, leaving no room for negotiation for suppliers. In case of quality deficiencies or the failure to respect the delivery time, high penalties apply. Under such circumstances, the manufacturer of the machine is compelled to take risks which cannot easily be assessed upfront, if s/he wants to win the contract.

For instance, the failure to deliver a machine on time may entitle the customer to charge to the supplier all costs incurred by the outsourcing of production to a third party until the time the machine is delivered. The OEM may also ask the supplier to ensure that the supplied machine does not lose its ability to maintain close tolerances even after the warranty period. Otherwise, costs for outsourcing and the expedition of components may be once again charged by the OEM to the supplier. In these cases, the supplier assumes a time-wise and magnitude-wise uncontrollable liability in terms of responsibility for consequential damages.

In a final example, it is possible to see the OEM acquiring the right to access to the supplier's background intellectual property in the case of termination for cause or any supply disruption. This may imply that the OEM can use a supplier's background intellectual property to make or have the parts made by a third party. In a knowledge-intensive and high-tech industry like the machine tools sector, intellectual property makes up for most of the value of companies.

One may think that suppliers could be protected against such risks by insurance. However, unlimited liability (UL) clauses present an uninsurable risk. Therefore, in case of invocation of the UL clause by the customer, it is very unlikely that a small supplier can afford to pay the important penalties that will arise. The supplier may ultimately find itself in insolvency

and then may lose its intellectual property rights (IPR) to the customer or to the contracting network of the latter.

Some may also suggest the diversification of the customer portfolio as a solution. However, switching costs are often too high especially for companies operating in niche technologies. It should be noted that in the case of the automotive sector, the number of OEMs does not exceed the number of fingers on a person's two hands. The disproportionate growth in the bargaining power of large OEMs, coupled with a lack of proper legislative protection and enforcement across the EU, prevents small suppliers from reacting to purchasing terms that they find detrimental to their business.

(Under)estimated consequences?

Unlimited liability clauses have effect also beyond the business relationship between the supplier and customer. UL may cause the supplier's costs of access to finance to skyrocket. Suppliers need to report UL clauses to their creditors in the banking and financial markets. Such risks need to be reported by publicly listed companies in their annual reports for risk assessment. For companies issuing bonds, the occurrence of UL requires an ad hoc publication. At a time when SMEs in Europe are having huge problems in accessing to finance, further barriers are the last thing they need.

Moreover, UL may impede mergers and acquisitions. When the suppliers' business is subject to due diligence, risks created by UL clauses on the supplier's side will inevitably affect the valuation. It may drastically reduce the value of the supplier's business. As some machine

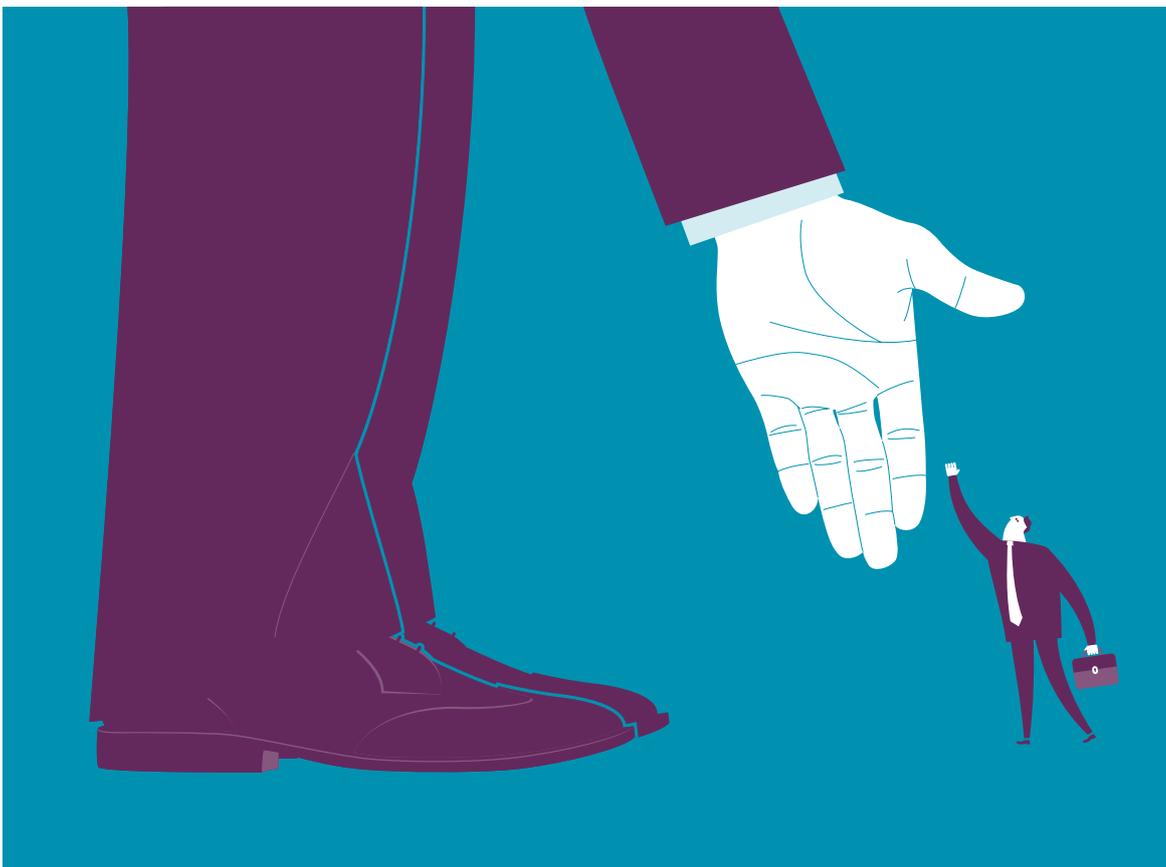
tool companies realize that their size does not meet the needs of a globalized markets and embark on succession planning, such impediments to M&A activities may harm the sustainability of a key-enabling sector like machine tools in Europe.

Finally, granting royalty-free access for the OEM to suppliers' intellectual background responds by no means to the needs of a knowledge-based innovative economy. This represents significant risks of IP leakage into the supply chain of the customer and may undermine the competitive position of advanced production technology suppliers in Europe.

Unlimited liability causes costs of finance for SMEs to skyrocket and have a knock-on effect on innovation.

Where is the limit?

The freedom of contract is the cornerstone in business-to-business relations for generating market efficiency. The companies' strong negotiation power can make weaker and dependent businesses feel compelled to innovate, which can ultimately create a robust and diverse supply chain and generate growth. However, if liabilities and obligations of machine tool suppliers specified in contracts are significantly disproportionate to the value of the project, their ability to manage and control the financial consequences is reduced to nil. Suppliers and customers can actually achieve better risk management and mitigation through dialogue and the establishment of mutual trust. ▶▶



UL clauses fall within the scope of national contract law and there is no EU regime addressing the business-to-business area. In some member states, a broad interpretation of the EU competition law captures these clauses whereas in some others, sector-specific regimes are established. Some of the clauses mentioned above are not enforceable under certain national legislations, for instance in France and Germany which prohibit commercial parties from enforcing provisions that give rise to significant imbalances in the parties' rights and obligations. However, it is estimated that in most cases, small suppliers will not dare to challenge their customers in front of the court for fear of retaliation.

A healthy, functioning system should strike a fine balance between the freedom of contract and fair dealing. Industrial development in Europe will come on a sustainable track in a rules-based environment favouring open competition and free markets.

There is a need to strike a fine balance between freedom of contract and fair dealing.

What to expect from the future?

What will happen next? One option is that customers and suppliers build their relations on a basis of mutual trust and dialogue. This would help suppliers develop a good understanding of customer needs, improve their responsiveness and achieve technical excellence, contributing to the competitiveness of customers. A healthy industrial ecosystem in which customers and suppliers grow together would underpin a competitive future for Europe's manufacturing industry.

If, on the contrary, the market players with a strong bargaining power continue to shift excessive compliance burden and risks on small suppliers, the viability of some key European sectors may be jeopardised. Uncertainties as regards unexpected future costs and the increasing costs of financing may have a knock-on effect on the ability of SMEs to invest, innovate and create jobs. The uneven protection against unfair practices across the EU could furthermore hinder cross-border trade.

The European Commission has an important role of monitoring market failures in the Single Market. It makes sense to interfere in the markets only when needed and by appropriate means. It is of utmost importance to first measure the breadth of the problem by establishing a knowledge base, through surveys amongst market actors and studies, of issues pertaining to the non-food supply chains. And this will happen only if the freshly appointed European Commission decides to include the issue of unlimited liability in its radar screen. ■

How the EU sees things

The European Commission issued in July 2014 a Communication on unfair trading practices (UTPs) in the food business-to-business supply chain, after dropping the "non-food" supply chain which was included in the Green Paper preceding the Communication. Besides, a voluntary "supply chain initiative" in the food sector was launched with a strong push from the Commission and Member States, with the aim of promoting fair business practices in the food supply chain.

The Communication states: "while differences in bargaining power are common and legitimate in commercial relationships, the abuse of such differences may sometimes lead to unfair trading practices." The following definition is suggested: "UTPs can broadly be defined as practices that grossly deviate from good commercial conduct, are contrary to good faith and fair dealing and are unilaterally imposed by one trading partner on another."

Amongst the most common practices which can be defined as UTPs, the Commission gives the following examples: "a trading partner's excessive and unpredictable transfer of costs or risks to its counterparty" and "the unfair termination or disruption of a commercial relationship". UTPs as defined by the Communication seem to correspond to issues faced by non-food industries. However, for the moment, the Commission chose to not to adopt a cross-sectoral approach to unfair trading practices and limit itself to the food sector.

The Commission's July Communication suggested to promote minimum enforcement standards applicable throughout the EU and EU-wide standards for principles of good practice based on the above-mentioned voluntary initiative. The aim of the EU action in is described as "contributing to fair and sustainable commercial relationships and a level playing field for market participants in the food supply chain through helping to reduce the harmful effects and possible cross-border obstacles caused by UTPs, especially for SMEs".



Machine tools play their role in tackling societal challenges

In the second half of the 20th century, Western societies have seen an economic boom and rising prosperity. It was a world in which natural resources were considered as unlimited, goods were mass-produced and economic growth relied on mass consumption. Towards the end of the last decade, we started facing the unpleasant results of irresponsible consumption and the mishandling of the effects of economic activity: environmental degradation, climate change, resource scarcity...

In the meanwhile, the world population and life expectancy have also grown and, in consequence, ensuring basic health and nutrition standards became a challenge. Today, economic growth alone hardly appeals to any conscious citizen. It has to be "sustainable": economically, socially and environmentally. People of the 21st century dream of living a quality life in a clean, healthy and safe environment. They ask themselves:

How can we optimize the resource and energy use whilst manufacturing goods? How can we make transport cleaner and more effective? How can we generate energy from the sun, the waves and the wind in an affordable manner? How can manufactured goods help improve the quality of life for the elderly, the disabled and the poor?

In the answers to all these questions, one word comes up: manufacturing. Physical goods - benefiting from improved features supported by internet and communication technologies - will provide the answers to today and tomorrow's societal challenges. The mastery of manufacturing technology is clearly one of Europe's key assets to invent and manufacture products of the future and therefore raise the quality of life.

Machine tools have traditionally been the key driver of productivity and efficiency in manufacturing economies. In the 21st century, the sector is focusing more than ever, on using its engineering capabilities to help user industries create sustainable and functional products in line with societal needs.

Starting from this issue, the CECIMO magazine will explore how machine tools play their role in generating solutions to the most important challenges facing the society.



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Flexible manufacturing and an adaptable workforce are key to a competitive future

by the AMRC

Major advances in the design and manufacture of civil aircraft have ensured that while demand for air travel has risen by 45 per cent, jet fuel consumption rose by just three per cent.

Thanks to advances in the design and manufacture of civil aircraft, travel has risen by 45% whilst jet fuel consumption rose by just 3%.

So said Colin Sirett, head of research and technology at Airbus, speaking at the recent Global Manufacturing Festival, held at the University of Sheffield Advanced Manufacturing Research Centre (AMRC) with Boeing's newly opened Training Centre.

The drive for even greater efficiency hasn't stopped there. Airbus alone is targeting a 40%

cut in the cost of its aircraft by 2020 and a 50% reduction in the time to get a new aircraft to market.

At the same time, pressure is mounting for increased flexibility to allow aircraft to be highly customised, with more variants of the same aircraft, each tailored to a customer's specific needs.

All of this is set against a background of an ageing skilled workforce which needs to be succeeded by a new generation of advanced apprentices.

Collaboration between researchers at centres like the AMRC, top tier manufacturers, the aerospace supply chain and manufacturers of machine tools and consumables has resulted in ground breaking improvements.

That collaboration has led to new machining

strategies that significantly reduce the time taken to make safety critical components, the number of operations involved, the material required and the need for reworking, while ensuring the highest quality standards are maintained.

But customer demand, rising concern over skills shortages and the need to remain globally competitive are now driving a movement towards increasingly flexible, automated factories, capable of producing a range of highly customisable products.

Running alongside this is a growing need for companies to be able to switch partially from manufacturing for aerospace into other sectors to ensure stable production levels in a market where contracts are shorter and customers more willing to change supplier than ever before.

Research has shown that, if it is to compete and grow, Europe's aerospace supply chain will need to develop reconfigurable factories with improved reaction times, including the ability to ramp production up and down.

The AMRC's 'Factory 2050,' currently under construction, with European Regional Development Fund backing, aims to showcase what could be possible.

Factory 2050 will have machines and manufacturing modules that can be moved around the shop floor and connected easily to services running below.

Data from sophisticated monitoring systems will be used by self-optimising technology to allow machine tools and processes to change the way they work, maximising production rates and minimising tool wear, while maintaining quality.

The circular Factory 2050 will also incorporate a rectangular extension large enough to accommodate an aircraft wing, which, nowadays, can require more than 40,000 holes machining.

The need to carry out repetitive tasks like that, while increasing flexibility, reducing machining and labour time and having the ability to machine hard-to-access component features is opening up the potential for using robots. However their structure and lack of stiffness, compared with classical machine tools, means robots are more prone to problems with vibrations – another area where current research into predicting and optimising processes could pay dividends

Factories may not be the only part of manufacturing that will need to be reconfigurable. The same is true of the workforce.

The AMRC is currently studying 'Intelligent Work Benches,' designed to supply components as and when they are required, together with easy to follow instructions, so that an employee can rapidly and accurately assemble products without needing the breadth of skills or the knowledge previously required.

To remain competitive, Europe's aerospace industry needs flexible, automated factories capable of producing highly customisable products.

Success in that field will still not provide the ultimate solution to the burning need for the advanced manufacturing sector to train more highly skilled staff at all levels and create pathways leading from the shop floor to the boardroom.

Technology transfer – and social mobility – can only really come through people who act as a direct link between research achievements, management and the shop floor, which is why the AMRC recently launched its own Training Centre, offering advanced apprenticeships with the option to go on to undergraduate and research degrees and business qualifications, in addition to opportunities for continuing professional development. ■

About the AMRC

The United Kingdom-based University of Sheffield Advanced Manufacturing Research Centre (AMRC) with Boeing is a world class centre for research into the advanced manufacturing technologies used in the aerospace, power generation, medical and other high value manufacturing sectors. The AMRC has built a global reputation for delivering research-based solutions to manufacturing problems for local, national and international companies and has become a model for collaborative research involving universities, academics and industry worldwide.

It has specialist expertise in machining, casting, welding and additive manufacturing and has an extensive composite manufacturing facility with unique capabilities in weaving, microwave curing and machining.

For further information, contact
Bob Rae, AMRC Communications Manager
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or visit www.amrc.co.uk

The EU's energy challenge and solutions from the machine tool industry

Towards a low carbon economy in the EU

The EU is working to meet the 2020 energy targets to reduce greenhouse gas emissions (GHG) by 20% compared to 1990 levels, to increase the share of renewable energy and to improve energy efficiency by 20% compared to projections. On 29 October 2014, EU leaders agreed on 2030 energy and climate targets: 40% for GHG and 27% for renewables and energy savings. The major motivation of the EU in setting these targets is to build a competitive and secure energy system that ensures affordable energy for all consumers, to increase the security of the EU's energy supplies, to reduce Europe's dependence on energy imports and creates new opportunities for growth and jobs.

Industrial users are increasingly concerned by rising energy costs as they face higher prices than most of the leading competitors across the globe. This risk is particularly high for industries producing tradable goods that are exposed to international competition including the advanced manufacturing industry. Moreover, the impact on EU manufacturers of increasing price volatilities on the global energy markets are magnified because of Europe's high dependence on energy imports, creating risks for investors. Therefore, a secure and sustainable supply of energy at an affordable price is crucial for establishing a reliable and stable framework for manufacturing investments and industrial competitiveness.

Advanced machining and assembly processes are required to reduce production costs for wind turbines.

Building sustainable and competitive energy systems require significant investments in manufacturing, distribution and installation of equipment, plant operation and maintenance. Engineering and manufacturing capabilities play a crucial role for constructing the necessary infrastructure in a cost-effective manner. According to the European Commission's scenarios on decarbonisation in the Energy Roadmap 2050, the average capital costs of the energy system will increase in the next two-three decades due to new investment needs in power plants and grids. Furthermore, large shares of the current energy supply capacities are coming to an end of their useful life will need to be replaced. The Commission stresses therefore the need to develop cost competitive technologies. New investment needs in energy infrastructure will at the same time open up new growth and job opportunities in industry.

Europe's machine tool manufacturers support the energy and climate objectives and are making utmost efforts to

help bring low-carbon technologies into the market in a fast, cheap, safe and environmentally friendly manner.

Sustainable production solutions for the wind power sector

Discussions about renewables within EU politics are often focused on market liberalisation and the cross-border connection of the energy network. Nevertheless, less attention is placed on Europe's manufacture capability of state-of-the-art energy generation equipment. Also, an important share of job openings that will be created through the shift to a low-carbon economy will come from the manufacturing technology industries.

Advanced machining and assembly processes are required to reduce production costs for wind turbines whilst improving their functionality and performance as well as reducing their impact on the environment (i.e. noise generation). Mastering manufacturing technologies is essential to machine complex parts better, faster and by using less energy. This helps reduce production costs and make new systems more affordable, ensure the sustainable use of resources and shorten the time-to-market.

The DANOBATGROUP, headquartered in Elgoibar (Gipuzkoa, Spain), is one of the pioneering companies providing production solutions for the energy generation sector. It has been designing and manufacturing machine tools for over half a century for various user industries including aerospace, automotive, capital goods, general engineering, railways and energy. Concerning the wind power sector, DANOBATGROUP generates solutions that meet current and future requirements for the manufacture of key components for wind turbines such as shafts, blades, hubs, gearboxes and towers, among others.

The company continuously strives for increasing the energy efficiency of machines used to build wind turbines and finds new solutions to optimize resource use, to avoid emissions and to increase the safety and work quality of machine operators through smarter control systems and tools.

So long as European machine tool manufacturers remain at the cutting edge of advanced manufacturing technology, they will continue transferring the latest production equipment and solutions to the generation sector which delivers high productivity and efficiency gains. As a result, European industry will lead the world race in innovation in low-carbon energy technologies, manufacture and deliver the required equipment and systems in a cost-efficient and sustainable manner, and create highly-qualified jobs throughout the value chain.



Improve the energy efficiency, reduce energy consumption, and avoid emissions:

In order to face global environmental, social and economic challenges, DANOBTGROUP aims at boosting the sustainability of its products by designing new machine concepts that are optimized and that include more efficient components, which at the same time lead to higher performance of machining processes.

- Machine designs based on minimized material weight of moving components.
- Stiffness of a structure by high dynamic axis control functions, which reduces energy consumption and develops and implements cutting-edge solutions such as stand-by options, regenerative braking; less weight components, and efficient machining processes.
- Optimized process cycles based on sophisticated technology support shortens machining time and save coolant and lubricant use, waste chips and energy consumption.
- Intelligent machining planning from the beginning of the life cycle of the equipment, defining the most appropriate production design in order to minimize the environmental impact.



Solutions for health and safety

DANOBTGROUP machines incorporate smart control systems that help operate and maintain the machines. These systems make the machines easier to use and increase safety and work quality, boosting the work and life quality of machine operators.

Research and implementation areas:

- Context-adaptive assistance for fault diagnosis
- Mobile, personalized tutoring systems
- Assistance in complex work processes
- Human-machine interaction



New developments that DANOBTGROUP is currently implementing on machines:

- Efficient cooling systems: good sizing of cooling unit, MQL (Minimum Quantity of Lubrication), cryogenization, nozzle design
- End of live management: material re-use, efficient components
- Simulation and modelling in order to save machining time, space occupation and tools, and avoid collisions
- Less environmental contamination: noise, pollution and emissions



DANOBTGROUP is the machine tool division of MONDRAGON Corporation, one of Europe's largest industrial holdings. The DANOBTGROUP offer is commercialized under two product brands: DANOBT, a reference in specialized solution for: sawing and drilling, turning, grinding, punching, bending, laser cutting, automated production systems for composite structural components and turnkey solutions for the railway industry. SORALUCE, a leader in milling machines, milling-boring machines and milling-turning centres. ■



interview:

Carl Martin Welcker, CEO of Schütte A.G.

Carl Martin Welcker is well known to the European machine tool industry. President and CEO since 1993 at Alfred H. Schütte GmbH & Co. KG in Cologne, Germany, which manufactures multi-spindle automatic lathes and 5-axis CNC grinding machines, he is also very active in different associations. From 2004 to 2010, he served as Chairman of the German Machine Tool Builders' Association (VDW). As a board member of the German Engineering Federation (VDMA) since 2001, Vice President of the VDMA and member of the executive board of the Federation of German Industry (BDI), he is engaged in topics concerning the entire industry. Welcker has been a CECIMO delegate since 2005.

You have been working in the machine tool sector for a quarter of century. How did you get there?

I was born and raised in the machine tool industry, so it wasn't a difficult decision. Of the 25 years spent working in the industry, I spent 23 of them working for Schütte, which is my own company, a family business.

What makes machine tools and related technologies stand out from other sectors? What makes them particularly interesting?

The machine tools sector is a wide and greatly interesting field because when it comes to technology, it pretty much combines everything that is state of the art in electronics, mechanics, hydraulics, pneumatics and other areas; name it and you will find it in a machine tool. As the CEO, my job is particularly interesting because I do sales, human resources, I work in the technical field and much more. Every morning when I come into the office, a new challenge is waiting.

How do you feel the machine tool sector has evolved over the years in Germany and in Europe? What are the biggest opportunities and challenges to European companies today?

When looking at the European machine tool industry in numbers, it hasn't grown much. Germany on the other hand has kept its position in the race between Japan, US and the now upcoming China. The challenge facing Germany right now is to keep up with Asian countries that are not only pushing low-end but also middle range technology on the market. Further challenges of globalisation include currency exchange rates and oversized capacity in many different sectors, such as turning, milling and grinding machines.

German machine builders' capacity to provide innovative solutions definitely helps to withstand that pressure and be successful in this globalising market. Besides keeping this innovative capacity, our next challenge is finding the right people and motivating them to come in the machine tool

sector rather than in the automotive or electronic industry.

So the skills challenge is an issue for the European MT industry?

Absolutely, I would even say it's a worldwide challenge. Machine tools are the «mother of machines», building all other machines and combining every technology. This is not some easy little task; it is probably the most complicated job that can only be done by highly qualified engineers. You don't have, like in the automotive sector, the advantage of mass production so sometimes, the first shot at building a machine has to be the right one. You do not get the chance of building one million machines of the same model, giving you the flexibility to identify all the potential flaws over a period of time. Maybe you will get the chance to build 20 or 50 machines alike. So really, you need excellent engineers who design and build a machine that will work from day one. To find these people is not easy since they must also be willing to work in a small or medium-sized company, not looking to make a career in an international business like automotive, so recruitment is also very competitive.

So if I understand correctly, the MT industry has problems recruiting because of its lack of appeal?

That is correct, and there are several issues why: first, because it is a business-to-business sector, the general public is not in contact with it and second, because machine tool companies are typically SMEs. They do not get the awareness of global players, they are not on the stock market for example, so yes it is difficult to attract the right people.

What are the solutions to this problem?

There is no secret trick and the solutions have been mentioned many times before. What works to an acceptable degree for us is to be close to schools and universities in our area. Another key to recruit talents is to offer work arrangements that are so attractive, that our employees talk about them to their friends and to their colleagues: «Hey, I have an interesting job! You might not know about my company, you might not really know what I am doing but, I tell you, I'm happy here, working on interesting subjects». That is how we win our employees, because they recommend us to their friends and families. It's not only me being the fourth generation here at Schütte, almost half of my employees are at least the second generation with our company. That's a lot!

You have been actively involved in the activities of CECIMO as representative of the German machine tool industry. What is the importance of CECIMO for the European machine tool industry?

The machine tool industry needs a strong voice in Brussels since more and more decisions are made at the European level. It makes sense for European national associations to join efforts

and to communicate our interests to the different European institutions. It is essential that the industry influences standards, norms and regulations so that they really correspond to the reality. To that end, CECIMO is very important, very useful and I think politicians also see it this way. The German machine tool industry gets involved and supports its European Association because it is the best way to be heard and, hopefully, our interests are in line with the ones of other European associations.

And how can politicians help the machine tool industry to thrive?

It is not the politicians who made the German industry successful. Actually, talking to the German politicians in the year 2000 or even 2003, you could hear them say that industry was the past; the future would be in television, software and the tertiary sector, but not in the industry. Time passed by and they learned the lesson.

Politicians can really have a great impact by putting efforts in building and strengthening a good education infrastructure. One of the bases for success of the German industry is its dual system, the apprenticeship program young Germans go through having a practical and theoretical education in some fields. So it is not so helpful to subsidize certain industries, it is not so much about keeping specified existing industrial jobs in Europe. It is about building infrastructure, starting with streets and big data lines, technical schools and a general curriculum with more time allocated to science. All that to ensure that in 10 or 15 years from now, Europe's industry does great, not because it is subsidized but because it is highly innovative which allows it to be competitive on the global market. ■



The machine tool industry's strategic role in advanced economies

Ronald V. Kalafsky, PhD
University of Tennessee, Department of Geography

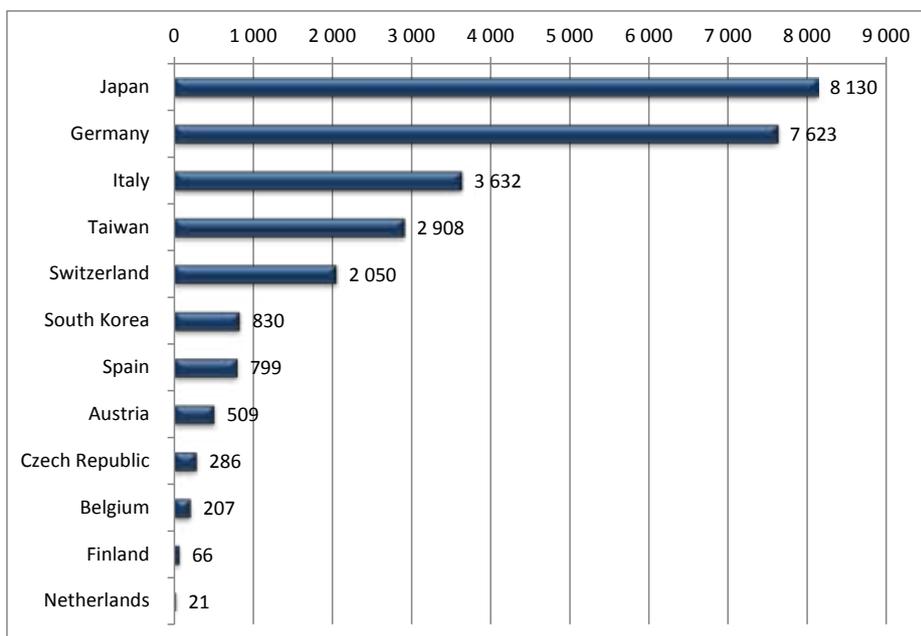
Advanced manufacturing is done in comparatively higher-wage countries and contributes significantly to long-term economic development. It remains an integral component of almost any industrialized economy.

The machine tool sector accounts for less than one percent of total employment, regardless of the country in which it is located. If this is the case, then why does the machine tool industry remain an essential component of almost any advanced economy? Numerous innovative (and high value-added) downriver industries rely on the contributions of machine tools, extending from surgical equipment to shipbuilding. Machine tools are often called 'mother machines,' due to their impacts on virtually every other manufacturing process, highlighting the significance of this industry to the wider European economy. In Japan (among the world's leaders in production, precision, exports, and trade balance for the industry) for example, the word moniker (literally 'mother machine') is used to describe machine tools.

Perhaps part of the reason why the machine tool industry does not receive much attention from the general public is the perception of manufacturing at-large. For example in the United States, as in many industrialized economies, too often people view manufacturing in terms of the three "D's" – dirty, dangerous, and difficult. Interestingly, this is not a sentiment held in just a few countries. In Japan, moreover, this attitude is expressed in terms of the three "K's": kitanai, kikken, and kitsui... with the same meanings and misconceptions. Maybe that is why it is difficult to convince the general public of the importance of a robust machine tool industry (or for that matter, manufacturing in general), whether at the national or regional levels. Interestingly, these perceptions occur at a time when much of the manufacturing that takes place in OECD countries embodies anything but the above descriptions.

Despite any of the above erroneous perceptions and a lack of attention by the general public, the machine tool industry has long remained pivotal to economic and industrial development. For example, Japan's once-famed Ministry of International Trade and Industry (MITI) viewed this

Machine tools are often called "mother machines" due to their impacts on virtually every other manufacturing process.



Countries with positive trade balances in machine tools, 2013 (in USD billions)

Source: Gardner Business Media, World Machine-Tool Output and Consumption Survey



industry as a critical component of its economic renaissance and industrialization processes during the mid- to late twentieth century. And, Japan is not alone in this case; the same emphasis on the machine tool sector has been seen in South Korea. Note that Japan's, and now South Korea's, ascents in machine tool prowess took place at the same time as their noteworthy increases in manufacturing, gross domestic product (GDP), and per capita GDP.

Beyond the macroeconomic-level indicators discussed above, the machine tool industry has other impacts on the economy. At an elementary level, a healthy machine tool sector can be viewed as a bellwether of a country's manufacturing innovation, and precision. And, given that machine tool production in most industrialized countries is considerably advanced, it can contribute to creating and maintaining a highly skilled workforce. In essence, a robust machine tool sector can have spillover effects on advanced manufacturing across the economy. The above reasons can be seen in dynamics manufacturing regions such as Japan's Greater Nagoya region and Germany's Ruhr Valley – agglomerations of machine tool production and advanced manufacturing. The economic activities and progressive industrial prowess of such regions proves that advanced manufacturing can still be done in comparatively higher-wage countries and contribute significantly to long-term economic development. In turn, a healthy manufacturing

sector fosters more support jobs than any other part of the economy and in most cases, supports above-average wages in comparison to many other economic sectors.

A healthy machine tool sector can be viewed as a bellwether of a country's manufacturing innovation, and precision.

A final point worth mentioning is the role of a globally competitive machine tool in international trade. Given that machine tools are found on factory floors around the world, it stands to reason that exports of these products would be an important contributor to a national or regional economy. Within the context of Europe, this is confirmed. According to the 2014 report on the global machine tool industry from Gardner, only twelve countries actually run a trade surplus in machine tools (see Figure 1). Interestingly, nine of these national machine tool industries are members of CECIMO. The above attributes point to the continued significance of the machine tool industry as a viable element of a successful economy well into the future and as a sector worthy of policy-led attention and support. And, on a related note, the evidence suggests that advanced manufacturing remains an integral component of almost any industrialized economy. ■

EXPLORE

EXPLORE the full potential of European research projects

The EXPLORE project aims at unleashing the full potential of the accumulated knowledge base at the European level through projects funded by the EC in the area of production technologies. It promotes the industrial exploitation of research results mainly by identifying new opportunities for demonstrators and pilot lines.

CECIMO Magazine interviewed Luis Carneiro of INESC Porto, the EXPLORE (Extended Exploitation of European Research Projects' Knowledge and Results) coordinator.

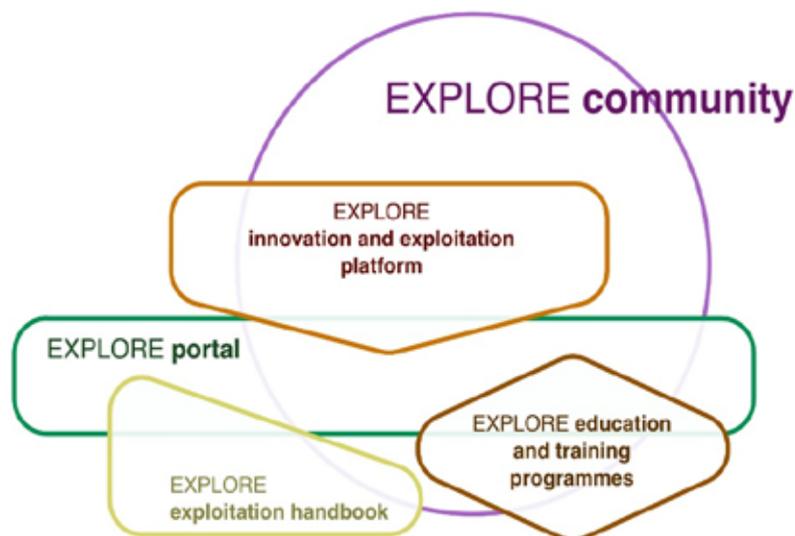
What have been the main drivers behind the conception of the EXPLORE project?

The European manufacturing industry's long term competitiveness and sustainability strongly depends on its capability to innovate and address new consumer needs and societal challenges. This calls for significant public and private investments in research and development (R&D), but also for a growing capability to transform the knowledge gained in research activities into new products, processes, services and business models.

Many of these challenges are multi-sectorial, so are the technologies needed to address them. The European Commission has supported the development of such horizontal technologies through its R&D programmes, creating over time a very rich knowledge portfolio. However, its exploitation and impact could be enlarged by reinforcing the wide dissemination of information and promoting cross-fertilisation with other sectors.

What are the main objectives of the EXPLORE project?

EXPLORE, a project funded by the 7th Framework Programme, seeks to unleash the full potential of the knowledge accumulated in through EU-funded projects in the domain of production technologies. We want to make sure that the knowledge acquired and technologies developed are further used in fostering advanced products and services to address manufacturing industries' challenges and needs. Therefore, EXPLORE is promoting and supporting the exploitation of R&D results, namely through their wide dissemination, the organisation of matchmaking events, the provision of support to the negotiation of exploitation agreements and the preparation of a roadmap for implementing medium-to-large size demonstrators and pilot lines. Other activities include the identification of standardization opportunities and the definition of proposals and action plans for education and training.



The objectives you mentioned call for the involvement of different stakeholders and bridging complementary knowledge and resources. How do you reach the goal?

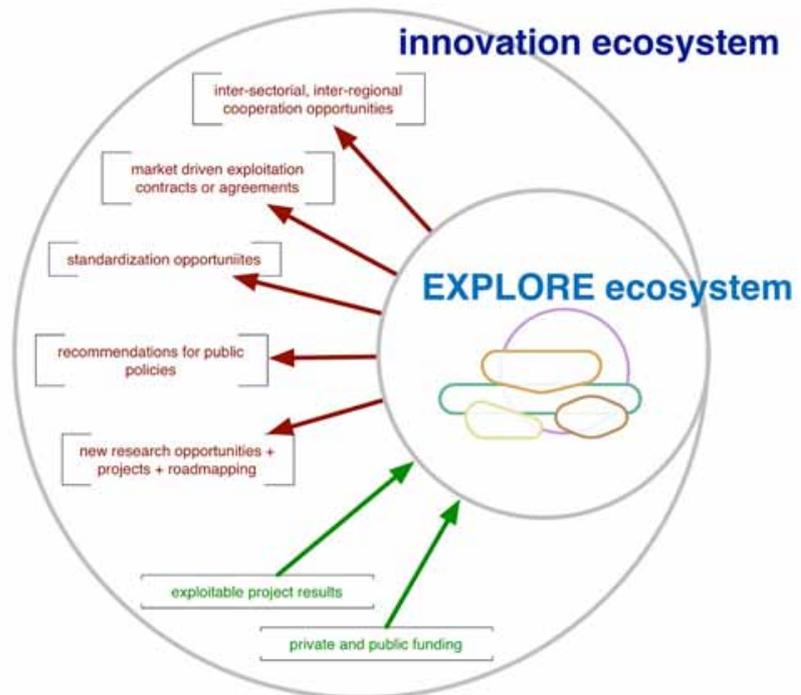
The project consortium gathers 14 partners representing industry, research, academia and business communities. Besides, the project has established a Strategic and Advisory Group including more than 40 regional authorities, industrial organisations and companies who have expressed interest in the project and are playing an active role.

Thanks to this common effort the project gathered until now a first set of 50 R&D results with different technology readiness levels which have the potential to be applied in various industrial sectors and across numerous innovation domains. The detailed information about these R&D results is accessible via the EXPLORE's Innovation and Exploitation Platform that has been launched in October this year. Moreover, in the first months of the project, we were able to characterize not only the manufacturing and innovation profiles in 17 European regions, with the support of the corresponding authorities, but also the innovation needs of 11 different industrial sectors thanks to the information provided by their respective European Technological Platforms or associations.

How does the Innovation and Exploitation Platform work?

The Platform is accessible through the EXPLORE project website (www.explore-fp7.eu). It comprises both of a frontend and back office. In the frontend it is possible to view detailed information about the R&D results and the involved organizations. After registering and signing in, it is possible to contact the owners of the R&D results, as well as to declare interest on the exploitation of each of those R&D results. The back office allows the registered users to manage their own information, including the creation and description of R&D results and to follow up the interaction with other users.

It will soon be possible to view information about the industrial sectors, regions, innovation domains, funding instruments and programmes, as well as training materials.



What will be the main objectives for EXPLORE's 2nd year?

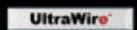
In the next period we will focus on organising matchmaking events in at least 17 European regions. Our goal is to match the needs of user industries (companies and sectors) with available exploitable R&D results, and if possible (and needed), secure the support of available national and regional funding instruments.

We will have reached our objectives if, by the end of the project, we have supported at least 15 exploitation contracts and agreements, we have developed an Exploitation Handbook (a simple document comprising all the relevant information and methodologies to exploit R&D results), we have identified the barriers and gaps to innovation and exploitation, and formulated recommendations to overcome them. Finally, we should also have drawn an education and training action plan and clearly described the challenge presented by unexploited innovation. ■



Luis Carneiro of INESC Porto, EXPLORE coordinator

The project **THERMACO** is part and coordinator of the **ERAMEC** cluster within the set up area 3.2.5 "Manufacturing processes for products made of composites or engineered metallic materials".



THERMACO

Smart Thermal conductive Al MMCs by casting

Smart Thermal conductive Al MMCs by casting

Integrating thermal highways into cast Aluminium parts. A technological breakthrough and a change of concept in every heat management application.

www.thermaco.eu

THERMACO focuses on the use of **novel, extremely efficient, carbon based** thermally conductive materials for **heat evacuation applications** in critical fields such as power microelectronics, e-mobility and (renewable) energy generation as well as highest performance combustion engines.

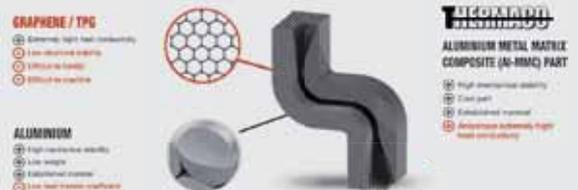
THERMACO provides **new manufacturing technologies to integrate "thermal highways"** based on Graphene and TPG into **Aluminium cast parts**, creating specifically designed, anisotropic Aluminium Metal Matrix Composites (Al-MMC), enabling many key technologies and products, bolstering Europe's high tech industry.

THERMACO addresses the **complete process chain** for multi-material heat conductive materials, aiming at **industrially relevant solutions** while taking environmental aspects into account. By incorporation of technological and strategic innovations, THERMACO provides products **applicable to a wide range of sectors**, backed by suitable tools and methodology for a **significant increase in functional properties** while ensuring **compact design, weight reduction and cost efficiency**.

THERMACO brings together eleven European stakeholders from Research, Academia and Industry, joining SME with large enterprises. By generating, exchanging and applying LEIT knowledge it strengthens the European bond and secures future European success.

OVERVIEW OF THERMACO'S APPROACH

THERMACO's approach for thermal highway integrated composite parts:



The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101019150.



Technische Universiteit Delft
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THERMACO

Smart thermal conductive aluminium metal matrix composites by casting

The THERMACO project, launched in 2013 and partly funded by the European Commission, brings together 11 industrial and research partners across Europe. CECIMO, the dissemination partner of the project, conducted an interview with Dr Henning Zeidler, Chemnitz University of Technology - Institute for Machine Tools and Production Processes, who coordinates the project.

Could you please tell us about the main challenges that the THERMACO project tackles?

Heat evacuation is a bottleneck in many key enabling technologies (KETs) and an increase in efficiency would free large potentials for system downsizing, weight and cost reduction and functional integration. THERMACO is a European project that focuses on the use of novel, extremely efficient, carbon based thermally conductive materials for heat evacuation applications in critical fields such as power micro-electronics, e-mobility and (renewable) energy generation as well as highest performance combustion engines.

How is the project addressing the challenge you described? What are the novel solutions provided by the project to face this challenge?

THERMACO provides manufacturing technologies and process chains to integrate thermal highways based on Graphene and TPG into Aluminium cast parts, creating extremely efficient solutions of heat evacuation using Aluminium Metal Matrix Composites (Al-MMC). While building on established processes like casting and combining them with new materials, the project enables new designs and concepts that can easily be transferred into industrial application.

What industrial sectors can benefit from the novelties delivered by the THERMACO project?

The project incorporates technological and strategic innovations in order to provide products applicable to a wide range of sectors with suitable tools and methodology for a significant increase in functional properties while ensuring compact design, weight reduction and cost efficiency. In the current consortium, end users from electronics and automotive industries are represented, but we see a lot of potential for precision machine tools, aerospace and energy sectors. All areas that require local thermal management – heating as well as cooling – could benefit from the THERMACO developments.

Let's talk more about the benefits foreseen for the machine tool industry. Can you please give us examples of how this research work could contribute to competitiveness of the European machine tool industry?

There are two ways in which the European machine tool industry benefits from the THERMACO results. Firstly, the developed components and materials can be used to enhance the machine tools in terms of energy-efficiency and precision, if you think of for instance their thermal management. Secondly, the machining of the composite parts needs special strategies to achieve the required accuracy and surface texture/precision. Within the project, both areas are investigated, giving the European machine tool industry a knowledge advance both as user and technology provider.

We want to address both technological developments and education issues since qualification is also crucial to ensure European competitiveness.

To conclude, can you tell us about TUC's plans to improve its partnership with machine tool companies across Europe under the Horizon 2020 programme?

In H2020, our focus is on "Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing, and Biotechnology" (NMP +B) within the "Leadership in Enabling and Industrial Technologies" part of the programme, with a specific interest in the Factories of the Future topics. As developers of resource-efficient production processes and chains, our links with the machine tool companies are strong not only within our regional network (Chemnitz is traditionally an important centre for the machine tool industry) but also at the European level. Our close collaboration with the Fraunhofer Institute for Machine Tools and Forming Technology IWU within the Competence Centre Microfabrication and Surface Technologies (KoMOT) is one keystone. Besides CECIMO, we strongly interact with the European Society for Precision Engineering and Nanotechnology (EUSPEN). We want to address both technological developments and education issues since qualification is also crucial to ensure European competitiveness. In short, our aim is to collaborate with the machine tool industry to ensure industry-relevant research and development, and H2020 is a good base to build upon. ■

To access further technical information on the project and to be informed about dissemination activities please visit www.thermaco.eu



INTElligent FIXtures for the Manufacturing of Low Rigidity Components

CHALLENGE

The machining of high added-value components is a challenge that the European manufacturing industry has to tackle, especially the aeronautic, energy, automotive, railway and machine tool sectors where these components are manufactured in small or single-unit batches by using high-performance materials. INTEFIX aims to tackle this challenge by developing intelligent fixture systems.

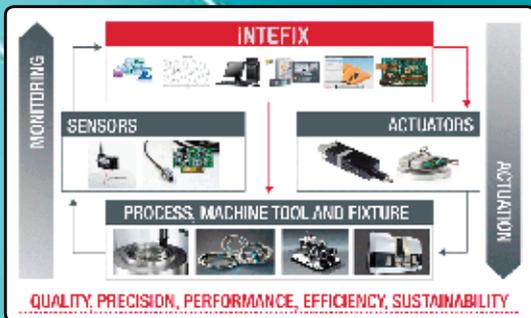
OBJECTIVES

- Develop intelligent fixture systems which monitor, control and adapt the machining process and deliver results according to precision, quality and cost requirement.
- Provide manufacturers with new features of automation, flexibility, versatility and accuracy and solve the problems of vibration, deformation and positioning.
- Integrate state-of-the-art sensors, actuators, control algorithms and simulation tools with workpiece handling systems to develop smart fixture systems which are capable of adapting behaviour and interactions in machining operations.

ORGANISATION

INTEFIX is based on a series of case studies for which suitable solutions will be developed combining sensors, actuators, machining technologies and ICT. INTEFIX will connect producers and end-users along the value chain and close the gap between research and industry by bringing together research partners and manufacturers.

The case studies are divided in three application scenarios, where the behaviour of the fixture is based on the information provided by the sensors and on the modification of the behaviour of the locators, supports and clamps.



**SCENARIO 1
VIBRATION**
Workpieces with problems of vibrations during machining. The intelligent fixture counteracts vibration problems by changing the dynamic properties, stiffness, damping, etc.

**SCENARIO 2
DEFORMATION**
Workpieces with problems of deformations/deflections/distortions during machining. The intelligence fixture counteracts the displacement of the workpiece through process development forces.

**SCENARIO 3
POSITIONING**
Workpieces with problems of reference setting. The intelligent fixture introduces small movements to correct linear and angular alignment of the workpiece.

PARTNERS



Acknowledgement

This work was supported by the European Commission Seventh Framework Programme under grant agreement number FP7-609306.

INTEFIX CASE STUDIES

- Identification and active damping of critical workpiece vibrations in milling of thin-walled impellers/blisks.
- Turning of low pressure turbine casting.
- Detection and compensation of workpiece distortions during machining of slender and thin-walled aerospace parts.
- Clamping of thin-walled curved workpieces.
- Distortions in aeronautical structural parts.
- Machining of aircraft turbine support structures.
- Fixture system for workpiece adjustment and clamping with/without its pre-deformation.
- Semiautomatic tool reference for application on large parts.

www.intefix.eu

intefix@tekniker.es

DESIGN-MTS:

A multi-stakeholder CSR platform in the machine tool sector

by Benedetta Giovanola, University of Macerata (Italy), DESIGN-MTS project coordinator

Corporate Social Responsibility

At the level of public policy, the European Commission (EC) is a leader in the promotion of corporate social responsibility (CSR) and this role is increasing in importance. The socially responsible behaviour of companies is considered as an important value of the European Union. CSR is seen by the EC as the process of integrating ethical, social, environmental concerns as well as consumer and human rights into business strategies and operations, in close cooperation with stakeholders. The EC approach to CSR is not prescriptive: it rather encourages the application of good practices and supports companies to adhere to major CSR guidelines and to create shared value both for themselves and the society at large.

Following this approach, the EC has elaborated a strategy and an agenda for action on CSR for the 2011-2014 period, with the following objectives: enhancing the visibility of CSR and disseminating good practices; improving and tracking levels of trust in business; improving self- and co-regulation processes; enhancing market rewards for CSR; improving company disclosure of social and environmental informations; further integrating CSR into education, training and research; emphasizing the importance of national and sub-national CSR policies; better aligning European and global approaches to CSR.

DESIGN-MTS project and the multi-stakeholder platform on CSR in machine tool sector

In order to reach the objective of enhancing the visibility of CSR and disseminating good practices, the EC has co-funded three projects which were expected to set forth multi-stakeholder sector-based platforms. DESIGN-MTS is one of the projects which have been endorsed by the EC. The project is led by Università degli Studi di Macerata (Italy) in partnership with CECIMO, CSR Europe, Central European Initiative (CEI), Istituto di Ricerche Economiche e Sociali (IRES, Italy) and the University of Nottingham. It was launched on 1 July 2013 and will end in December 2014.

The main objectives of the project are to spread awareness of CSR, to encourage the exchange of best practices, to disseminate responsible business conduct, to enhance the visibility of CSR, to encourage and enable more and more European enterprises in the machine tool sector across the EU to take a strategic approach to CSR (with a view to increasing its competitiveness), and to promote stakeholder dialogue along the value chain. To this end, the project has identified the major areas of relevance in CSR for the machine

tool industry and has assessed the existing situation and the best practices in the sector. Main findings were disseminated through a series of events including sectoral trade shows, such as the 29th. BI-MU exhibition, which took place in Milan at the beginning of October.

Furthermore, DESIGN-MTS has launched and built up a multi-stakeholder platform on CSR in the machine tool sector in order to facilitate stakeholder dialogue and consensus building, to foster the adoption of joint commitments and to provide multi-lateral support to CSR. The platform offers important tools, such as guidelines for the implementation of a strategic approach to CSR in machine tools companies and their supply chain; an on call and on-line help desk; free on-line training modules on CSR, which are available on the project platform (www.designmts.eu),

The project and the multi-stakeholder platform have reached important results until now. The next challenge is to capitalise on these results to further encourage the adoption of CSR along industrial value chains and to promote stakeholder dialogue by bringing together representatives of different sectors, from the academia, enterprises, business associations, work representatives, civil society organizations, public authorities and policy makers. Only such a multi-dimensional and multi-stakeholder approach indeed, can help us to meet today's challenges. ■

For more information on the project, visit www.designmts.eu



Inside CECIMO:



The Swiss association of mechanical and electrical engineering industries:

A strong association for Switzerland, a good base for the machine tool manufacturers, a strong location for industry and a strong hub for research.

Swissmem unites just over 1000 companies from Switzerland's mechanical and electrical engineering industries (MEM industries) as well as from related technology-oriented sectors. Swissmem is a multi-sectorial, independent and incisive voice that represents the interests of Swiss industry in economic, political and public debates. In this way, it strengthens Switzerland's ability to compete at international level as a location for industry and research.

Swissmem effectively identifies the concerns of its member companies, encourages active networking and provides efficient services tailored to their needs. These include advice on export matters, assistance with labour law problems, sector-specific educational and training programmes plus custom-made activities for the individual divisions (currently 26 sub-sectors). Swissmem is committed to open competition, innovation and entrepreneurial freedom coupled with social responsibility and also campaigns for a constructive social partnership system.

The Association of Swiss Engineering Employers (ASM), which is organized under the Swissmem umbrella, is also a partner in the most significant collective employment agreement within the industry.

The MEM industries occupy a key position within the Swiss economy: Employing more than 330,000 people, they are by far the largest industrial employer and, with exports of around CHF 65 billion in 2013 (or EUR 54 billion), account for one third of total Swiss exports. Companies in the MEM industries have an excellent global reputation as suppliers of technologically advanced products and services as well as of whole systems and plants.

The Swissmem Machine Tool Manufacturers, as the biggest division or sub-sector of Swissmem, represents 80 Swiss manufacturers of machine tools as well as related sub-systems which accounts for about 10% of the membership. It is the Swiss member of

CECIMO. Christoph Blättler, Secretary General of Swissmem Machine Tool Manufacturers, leads, coordinates and administers the division.

Additional services provided to its members comprise common participations, Swiss Pavilions and special promotion events at major international machine tool industry trade shows. Further to this, statistical data collection and preparation of sub-sector specific prognosis is organised within the division. These data, the general economic situation and necessary actions are discussed regularly in three board meetings and one general assembly evenly distributed throughout the year. The board is composed of 12 owners and/or CEO's of major companies of the Swiss machine tool industry. The current 6 Swiss CECIMO delegates are all selected from the board.

Through the initiative, decisive action and start-up funding of this division, Inspire AG - see www.inspire.ethz.ch - at the iwf (Institute of Machine Tools and Manufacturing) of ETH (Federal Institute of Technology) Zürich could be established years ago. Today, it has become one of the major actors driving accelerated technology transfer and innovation in machine tool design and manufacturing technology in Switzerland and Europe. Further initiatives of the division include mechanical engineering student programs in China and Japan as well as the instigation of the annual one day Swissmem Symposium, providing every year about 140 executives of the industry with up-to-day insights on a topic of high interest at the time.

Christoph Blättler states: "Swissmem Machine Tool Manufacturers strive to foster a conducive business environment for this strategic enabling industry in Switzerland and Europe. It will continue to launch and support actions on a national and international level since it firmly believes that a healthy machine tool industry is at the heart of any sustainably successful national economy with substantial industrial manufacturing." ■



We strive to foster a conducive business environment for this strategic enabling sector in Switzerland and Europe"

Christoph Blättler, Secretary General of Swissmem Machine Tool Manufacturers





CECIMO Noticeboard

New people in CECIMO:



Petr Beneš
Czech Delegate
Managing Director,
Pramet Tools s.r.o.



Niel Chr. Nielsen
Senior Advisor
The Manufacturing Industry
a part of the Confederation of the
Danish Industry



Georges Blaha
Czech Delegate
General Manager, Schneeberger
Mineralgusstechnik s.r.o.



Oldřich Pačlík
General Manager
Svaz Strojírenské Technologie
(SST)



Lau Jensen
Danish Delegate
Managing Director, DMG MORI
SEIKI Denmark ApS



James Selka
Chief Executive Officer
The Manufacturing Technologies
Association (MTA)

Upcoming Events:

CECIMO's 2014 Fall General Assembly

3-4 December 2014 - Brussels, Belgium

Additive Manufacturing Event

Spring 2015 - Brussels, Belgium

CECIMO's 2015 Spring General Assembly

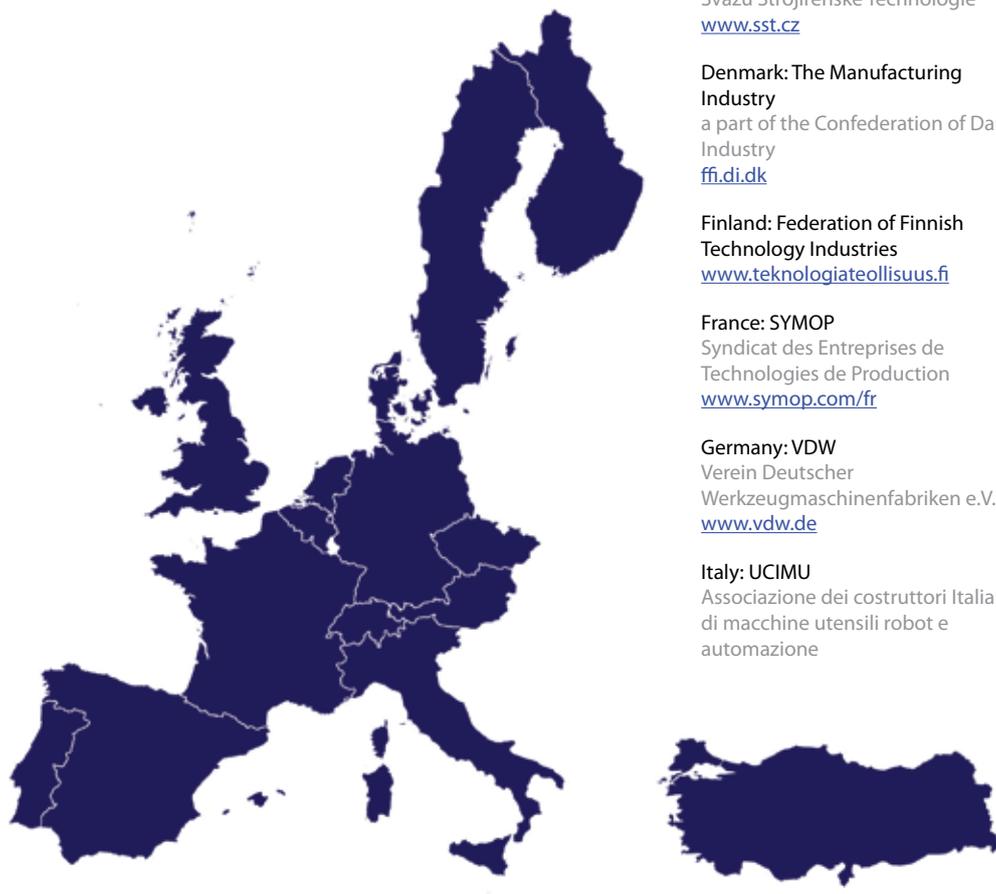
3-6 July, 2015 - Bordeaux, France

EMO Milano

5-10 October 2015 - Milan, Italy



CECIMO Member Associations



Austria: FMMI
Fachverband Maschinen &
Metallwaren Industrie
www.fmmi.at

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
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**Finland: Federation of Finnish
Technology Industries**
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
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di macchine utensili robot e
automazione

www.ucimu.it

Netherlands: VIMAG
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**Spain: AFM - Advanced
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Sweden: MTAS
Machine and Tool Association of
Sweden
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Die Schweizer Maschinen-, Elektro-
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United Kingdom: MTA
The Manufacturing Technologies
Association
www.mta.org.uk

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*, 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.

*Europe = EU + EFTA + Turkey

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