



European INDU STRY DAY 2018

Summary of the discussions

#EUIndustryDay

#InvestEU

*Internal market,
Industry,
Entrepreneurship
and SMEs*

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This report was prepared by:

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs

Directorate F – Innovation and Advanced Manufacturing

Unit F1 – Innovation Policy and Investment for Growth

In co-operation with

Directorate-General for Research and Innovation

Directorate D – Industrial Technologies

Acknowledgements:

The authors are grateful to all the participants of the second European Industry Day for their contributions to this publication.

Second European Industry Day

22-23 February 2018

Summary of the discussions

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The second European Industry Day 2018 gathered almost 1000 participants from across EU and across industrial sectors. Over 9000 people watched live web streaming over two days, and over 11,000 visited the conference web-page. Co-ownership and co-creation were the driving force of this year's edition as stakeholders organised 15 thematic workshops as part of the agenda. An exhibition with 30 projects showcased EU support to industrial transformation. In addition, around 50 local events were organised in Europe under the European Industry Week brand.

The interest surrounding the 2018 edition, even greater than last year, shows that "Europe is back" in terms of its industry, and with a new political dynamic that started with the Industrial Policy Strategy Communication adopted in September 2017.

This report presents the main outcomes of the conference from the speakers' perspective.

I. INTRODUCTION

Jean-Claude Juncker, President of the European Commission



I am sorry I was not present at the conference but I am sure that with Maroš, Jyrki, Elżbieta and Carlos you were in safe hands. The fact they are all with you shows how far and wide industrial policy goes in this Commission. From investment to innovation, from skills to science.

European industry has always been the jewel in the crown of our Union. It drives our economy, it provides a livelihood for millions and it is a hub for our world-leading innovators. Just as it was decades ago when my father worked in the local

steel-plant, Europe is still an industrial society – both at heart and in practice.

The figures tell this story better than I can: Thanks to the 1.5 million new jobs since 2013, 32 million people now work in our industrial sector. Productivity went up by 3.1% between July 2016 and 2017. Industry now accounts for over two-thirds of our exports. And every single manufacturing job in Europe creates another 2.5 jobs across the value chain. This paints a healthy picture. But in a changing world, we cannot afford to stand still.

New technologies are changing Europe's industrial landscape. Our economies are becoming ever cleaner and more digital. Breakthroughs in areas like robotics, artificial intelligence and the bio-economy – to name just a few – are transforming the way we live, work and produce things. This will create new markets and make others outdated. To stay competitive, we must adapt. At local, regional, national and European level.

This time last year, you called for a comprehensive approach. We listened and we took action. In September, we presented our new industrial policy strategy for Europe. It brings everything that we already do on industry together. From space to defence, from plastics to public procurement, from the green transition to sustainable finance: we must all pull in the same direction. And that means we must also listen to what industry stakeholders tell us. This is why we have acted on your calls for greater dialogue to shape our policy together.

A central part of our strategy is free and fair trade – for which Europe is now the leading global voice. But we will not be naïve either. Where others do not play by the rules, we will show our teeth – as we have repeatedly done with China over steel dumping.

And lastly, but most importantly, we will help Europe's workers adapt to these changes and new skill requirements through the new European Pillar of Social Rights.

The discussions you had during the conference about the future of our industry go to the heart of the debate on the future of our Union. The European Industry Day is your chance to shape that debate and make sure that our Union keeps pace with our industry.

I count on you to do that and I look forward to seeing you all very soon.

Antonio Tajani, President of the European Parliament

During my five years spent as Commissioner and Vice President for Industry and Entrepreneurships, I have worked hard and pushed towards a strong European Industrial Renaissance.

Industry provides 36 million direct jobs, and contributes to a high standard of living for our citizens. The good export performance of our industry over the last years has been a key factor to help our economy out of the crisis, but we now need a modern industrial policy able to create a business friendly environment to attract investments. Last year's resolution of the Parliament and the Commission Communication on EU Industrial Policy strategy is therefore a step in the right direction.



All of our policies, from trade to competition, from research to energy, digital, education, should work together for an EU modern reindustrialisation. Industry needs a stable legal environment, less red tape and easy access to raw materials, energy, capitals, skills and to internal and global markets.

We need to continue our efforts to simplify our legislation, especially for the small and medium sized companies. We have to complete the single market for goods and services, end ensure that it works appropriately. The goods package presented by the Commission some weeks ago is going in the right direction as well as the work we are doing on standardization.

I support the proposal for a Common Corporate Tax Base in EU and the principle that taxes should be paid where companies have their effective management. Two days ago, the ECON Committee of the European Parliament voted in this direction with a large majority.

We are advancing on the energy package measures and I hope that the related negotiations will be successful in the coming months.

We should seize the opportunities of the digital transformation to boost industry competitiveness, its innovation capacity and fuel sustainable growth and jobs. To do this, we need to complete our digital single market, invest in infrastructures and digital solutions.

Our economy needs more high-skilled workers. Stronger investments are necessary on life-long training. As millions of the current jobs will be lost due to the technological transformation, we need to equip and empower our citizens to re-enter into the labour market.

In addition, more EU resources should be dedicated to help our industrial innovation and the next EU budget should take this priority into account. It should give an answer to the requests of our citizens such as strengthening our real economy to reduce youth unemployment, fight against illegal immigration, security and climate change.

The European Fund for Strategic Investments (EFSI), COSME and Regional funds as well as the European Investment Bank should further support industrial investments together with the "Industry 4.0" national plans. This is the only way to help our start-ups to grow and to provide good jobs to 23 million of our unemployed youth.

European and global value chain should be further exploited and our market should remain open, but we should also ensure fair trade among companies. The new method of calculating anti-dumping duties that was implemented last year is therefore a mark of progress. We also see a significant increase in Chinese investment in Europe. This is good news, but we need to insist on reciprocity and avoid transfers of sensitive technologies.

Although economic growth is gradually strengthening again in the EU, the level of young unemployment remains very high in several regions and the economic and social gap is widening. We must give a strong response to these challenges, and be closer to our citizens.

To continue the European dream, we need to work together to offer prosperity to our citizens and this cannot be achieved without your support.

Jyrki Katainen, European Commission Vice-President for Jobs, Growth, Investment & Competitiveness¹

At present, growth is picking up and we are starting to see the results of our determined policy action. Whilst Europe has already achieved a lot, we should now continue to share knowledge and new ideas on how to face the challenges of industrial modernisation. This is a process in which we need to continuously re-invent ourselves, as improving our industry's competitiveness remains our common goal. The success of the industrial policy in Europe is a joint venture and everyone has a role to play, as success is built on a fruitful cooperation of the EU countries, regions, European institutions, and above all, on the active role of industry itself.

Our aim is to promote a holistic and ambitious approach, and, in doing so, we want to strengthen industry's ability to adapt and innovate, to enable it to take advantage of the global megatrends and lead the way.



The role of a successful industrial policy is to create the best framework conditions to strengthen industry's ability to adapt and innovate. Our industrial policy strategy at EU level relies heavily on the Commission's key policy priorities on which we continue to deliver with good results: the investment plan, the capital markets union, the energy union, digital single market and single market strategies and open, rules-based trade. We believe that an open, outward-looking EU will be best placed to become the

destination of choice for global talent, investment and business.

EU industry is a world leader especially in high value added, low carbon and sophisticated products and services. With a deep pool of talent, educated workforce, our traditions of innovation and our 500 million people in the Single Market with common rules should be heavily utilised, as these are strengths that give us a strong basis to build upon. Furthermore, European companies hold 40% of the world's patents for renewable technologies. In order to build our resilience in the face of global competition a better functioning single market is needed as well as a regulatory framework that is fit for purpose and an enabler of innovation.

Digitisation and Artificial Intelligence should also be fully embraced. The share of Robotics and Artificial Intelligence in Horizon 2020 is one of the world's largest civilian research programs. However, the digital transformation is fast so European industry has to be fast too. The Artificial

¹ Excerpts from Jyrki Katainen's opening keynote speech. Full speech is available: http://europa.eu/rapid/press-release_SPEECH-18-1062_en.htm

Intelligence strategy that will be launched this spring will therefore aim to heighten Europe's ambition.

We should endow people with skills that they will need throughout their working life, which is precisely the purpose of our Skills Agenda. Europe's leadership in low-carbon and circular economy should also be asserted and investments in research and innovation and the industry of the future should be made. The strategic role of public procurement in this respect is also highly important.

Finally, we need to improve access to global markets and promote an open, rules-based trade to fight unfair practices. We also continue to work to protect and relaunch the rules-based trading system in the World Trade Organisation. The importance of rules-based trade cannot be underestimated. It is a powerful instrument for promoting security, prosperity and peace.

Artificial intelligence, robotics, bio-economy and new energy systems are all hallmarks of the new industrial age that will bring productivity growth, innovation and competitiveness back to Europe. The European Industry Day gives us the opportunity to discover everything we have to offer at European level to help European industry become stronger and it enables us to discuss with our stakeholders what more can be done. Let us not forget that this is a joint effort. We are all in this together.

Elżbieta Bieńkowska, European Commissioner for Internal Market, Industry, Entrepreneurship and SMEs²

The idea behind the Industry Day is very simple: we want to give our stakeholders a platform to speak and to discuss. We need this dialogue to make the European economy more competitive and innovative, and above all, to create sustainable jobs.

The transition to a digital, low carbon global economy will enable and offer better products and services as well as new and better jobs for our citizens. Europe has the skills as well as the

innovators, but it is understandable that the transition will be hard as change requires investment and involves taking risks.

Productivity and investment are on the rise across Europe, but this is not happening uniformly. The uptake of digital technologies like big data and the Internet of Things is increasing in most Member States. But, it is not happening fast enough Industry needs to adapt otherwise, citizens will be left behind.

Adapting to change is the role of businesses but we need to provide the right framework conditions. This is the approach of our Industrial Policy Strategy where we are working on stimulating investment in Key Enabling Technologies to support cutting edge technologies. Under Horizon 2020 alone, we invest 6 billion Euros in research and development in this area. But we don't need just research and development in



² Excerpts from Elżbieta Bieńkowska's speech. Full speech is available: http://europa.eu/rapid/press-release_SPEECH-18-1162_en.htm

technologies. What matters is their uptake by industry. We are also increasing our capacities with regards to Artificial Intelligence (AI). Europe is home to three of the world's largest producers of industrial robots, and they must therefore be exploited to their full capacity. Simultaneously, we must also help our SMEs to fully embrace the benefits of AI. Technologies alone are not the answer. We need a strong industrial base to turn technology into new production and services. We need to make strategic value chains stronger and we need to re-skill and upskill our workforce in order to adapt to all these changes. On 17 January, we presented a new Digital Education and Training Action Plan. This is a new strategic approach to implement demand driven sectoral skills strategies. There can be no strong European industry without a strong Single Market. We now have a home market of 500 million people and our businesses have a launch pad to compete globally. This has enabled the creation of more jobs and higher income across the EU. The EU GDP has increased by 1.7%, which equates to an extra €250 billion a year. However there is still more to do, as there are too many areas in which Member States adopt laws but then do not do enough to implement or enforce them. Instead therefore of having one giant Single Market, we still have fragmented mini markets.

In the Commission, we are continuing to push for a full Single Market that benefits our industry and our citizens. We are pushing for stronger and simpler intellectual property right protection as well as also looking to make sure that EU generics are no longer at a competitive disadvantage with non-EU players. Two months ago, we tabled a major goods package to promote faster mutual recognition and stronger enforcement. It is now up to Council and Parliament to adopt it promptly.

All of us, the Commission and Member States, the regions and industry need to work together to strengthen industry and create more opportunities in Europe. It is not the technologies but the people that should shape the future.

Carlos Moedas, European Commissioner for Research, Science, and Innovation³

Our union's industrial integrity is facing new threats. Beyond our borders, to the west, the world's largest economy is becoming more closed and protectionist. To the east, a rising economy and a formidable competitor is making its presence known.

Nonetheless, the role of our industry in our Union remains the same and it is getting stronger by the day. We therefore need to put our full forces behind sustaining a competitive and resilient European industry.

Europe is in pole position for this next wave of innovation. The next wave - from AI, to biotech, to two dimensional materials – they all require cutting edge science. But of course science alone is not enough. For Europe to lead the next



³ Excerpts from Carlos Moedas' speech. Full speech is available: http://europa.eu/rapid/press-release_SPEECH-18-1164_en.htm

wave of innovation, we need a new force of momentum.

First, science is needed to develop the new ideas and technologies of the future. Start-ups and SMEs are also needed to develop the breakthrough innovations. Thirdly, industry is needed to scale up innovations and create economic and social impact. To ensure that Europe does not only start the race in pole position but also finishes in first place, we need to support and invest in these three categories. Over this 7 year cycle we will invest more than 20 billion euros directly into industry. Our support to science, through the European Research Council, is one of the best in the world and so it should be developed even further. Due to the success of Horizon 2020's support to industry, the level of industry participation has gone up. This participation means tangible innovation. Furthermore, nine out of ten of the collaborative projects include at least one private sector partner. There are two particular ways in which we work with industry: the Public Private Partnerships, otherwise known as PPPs, and Key Enabling Technologies (KETs).

The PPPs have been a success. Through the Innovative Medicines Initiative we developed the first ever Ebola vaccine. Through Clean Sky we are developing new open motors that will reduce CO2 emissions by 30%. Key Enabling Technologies are our essential building blocks with which we have the power to create products that place us at the forefront of an advanced economy. Since they underpin our global leadership in so many EU industries, their importance cannot be understated. Furthermore, start-ups and SMEs are the areas that hold the greatest potential for breakthrough innovation.

The European Innovation Council should be the link between the start-ups and the corporates by helping start-ups to access partners across value chains from corporates, to investors, to public procurers, and technology providers. At the same time, large corporates should be able to help start-ups to scale-up.

The European Industry Day serves as an occasion to launch the EIC Horizon Prize on Innovative Batteries for e-Vehicles. 10 million euros will be awarded to those who can develop a safe and sustainable battery for electric vehicles. This means batteries that have same driving ranges as internal combustion and batteries that are able to be recharged in the same time you fill a conventional fuel tank.

Industry in Europe has overcome so many obstacles. It is strong, but it will face new challenges with the next wave of innovation. However this next wave represents a unique opportunity for European industry to leverage Europe's fantastic science and technology to create new ecosystems between science, start-ups and industry and to start winning the race on breakthrough innovation.

II. DAY 1

Emil Karanikolov, Minister of Economy, Bulgarian Presidency

Due to today's global changes and challenges, a long-term strategic approach is urgently needed to ensure the competitive future of EU industry. The long-term approach of industrial policy must be based on the development of the competitive advantages of the European economy. Namely, the key European assets such as: good physical and digital infrastructure, workforce skills, innovative potential, well-functioning Single Market, predictable and consistent regulatory environment, and effective governance. At the same time, the future strategy should reflect the existing value chains by creating opportunities within EU companies.

It is also crucial to develop the potential for innovation to become market-based products that create real advantages for European businesses and consumers. Last but not least, the industrial strategy must take into account the global trends, development and policies of our competitors. Policies in the field of climate change, environment, energy and resource efficiency set essential requirements for industry, including base and energy-intensive industries. It is necessary for the future industrial strategy to provide solutions that link the achievement of the targets set by 2030 and beyond with the opportunities for sustainable and competitive development of these enterprises. This calls for an ambitious approach that integrates industry into the overall transition efforts towards low-carbon, and digital economy. In the context of efforts to move towards a low-carbon economy and in light of ambitious industrial strategies in other parts of the world, it is particularly important to ensure equal opportunities for global competition.

Emma Marcegaglia, President BusinessEurope

Protectionism will not make Europe's industry stronger. Europe must remain an open market and resist inward-looking national industrial policies. The measures taken by our main competitors like the US and China to support their industries must be duly accounted if we want to stay competitive in the global market. It is our joint responsibility to make sure that it will be our model that prevails.

Europe needs to ensure it focuses on its own industrial strengths and ensure that it can compete with its main competitors. Bold decisions to show serious policy-makers are on industrial policy will come very soon. The first one will be on investments in research and innovation in the forthcoming MFF framework negotiations. We must make sure that support to industrial-led projects does not become blurry in the "FP9". Industry needs clarity and certainty that Europe is committed to support industrial technologies and research to tackle societal challenges.



FUTURE OF WORK: AUTOMATION OR CO-CREATION?

Ann Mettler, Head of the European Political Strategy Centre

The nature of work and the ways it is performed have changed multiple times throughout human history. However, the pace of change has accelerated significantly with the spread of digital technologies. Many of today's jobs and most sought-after skills did not exist a decade ago, while routine occupations are vulnerable to automation.

Skills continue to be the best guarantor of social mobility and opportunity. While Europe, with its highly-skilled workforce and its emphasis on creative freedom and intellectual independence, might possess an advantageous 'skills endowment', it is clear that not all parts of our population are equally prepared for the future of work.

Furthermore, in an era of accelerating change, skills are not static and need to be updated and fine-tuned constantly throughout working lives. 'Learning how to learn' is already becoming the most important skill of all, and extending opportunities for life-long learning will be critical to support the numerous transitions that will likely characterise future employment.

Yet, this too often contrasts with Europe's educational systems which tend not only to be frontloaded, but also anchored in teaching disciplines rather than competences. And, as humans may increasingly find themselves competing with robots – not only on routine tasks and low-skill jobs – we will have to refocus on the skills that have been central to human advancement to date: creativity, problem-solving, negotiation, adaptability, critical thinking, collaboration, empathy and emotions, and cross-cultural communication.

So it would certainly be wrong to conclude that the EU doesn't need to react to the changes ahead. AI and automation go hand in hand with changing work habits and new skills requirements, but these developments can be as much an opportunity as they are a challenge.

As such, what the future of work holds is an open-ended question. Outcomes are not pre-determined but will be shaped by the policies and choices we make today. This is why it is all the more important to properly understand the megatrends which are driving the changes in work patterns and to identify the skills that ensure that AI and automation augment rather than displace humans.

Jadwiga Emilewicz, Minister of Entrepreneurship and Technology of Poland

Industry 4.0 may be a solution for societal challenges related to shrinking workforces. Thanks to new technologies employees are often more productive and safe. Digitalization of production increases the role of intellectual capital in an enterprise - i.e. competence-based employment. That raises a challenge in our education, training and LLL systems.

The key fact is that digitalization creates new models of cooperation between entrepreneurs and employees. They will be most probably more flexible, similar to the current form of self-employment. Nowadays, according to many rankings, Polish IT developers are one of the best in the world. This is one of the factors why digitization in Poland is being conducted so smoothly.

It is important to communicate that digitalisation should not be connected with job losses. It creates HR demand in other areas - like for instance machine supervision. It will increase safety at work and will allow more complex goods to be created.

In this process it is necessary to ensure a good working cooperation with all relevant stakeholders including the labour unions and allow for continuous trainings aimed at digital skills upgrading.

Christel Heydemann, Executive Vice President of France Operations Schneider Electric

The era of digital transformation is not imminent- it is already in full swing. Digitization has accelerated for Industrial companies due to all the new technologies available. The digital revolution offers opportunities for job creation in Europe, according to the 2017 World Economy Forum's report. Taking Germany as an example, early adoption of automation could add 2.4 percentage points to annual per capita GDP growth to 2030, which is significantly more than the annual drag of 0.6 percentage points anticipated due to ageing. However, the negative perception in Europe is that almost 75% of all Europeans expect technology to destroy more jobs than it creates, according to the same World Economy Forum report. For Schneider however, digitization is driving revolutionary business opportunities with new business models and revenue streams whose success relies on people.

Technology adoption, Industry 4.0, the future of production and shifting value chains will alter global labour demand. Mismatching in skills is unfortunately increasing but we are starting to see a trend of reshoring. With this, European citizens will see that new opportunities are being created for them.

We need a talented workforce to meet the current challenges. To achieve this, we need firstly to create an adaptive workforce to enable the sharing of resources which will reduce the need for hiring and firing employees. Secondly, we need to plan for an uncertain future. Organizations can reduce the long-term disruption of the workforce; maintain higher employment levels, and reduce potential restructuring costs by using workforce data and advanced analytic. Thirdly, the up-skilling and reinvigoration of the workforce is essential. Upskilling the workforce will not only help disrupted workers, but it will also improve worker engagement.

A core element of the success of industrial policy is European people and workforce, and digital skills must be a European priority. In 2016, 37% of the EU labour force had an insufficient level of digital skills.

The core priority for Europe should not only focus on a digital single market but it should also focus on the societal and economic benefits related to digitization such as digital transformation for sustainability and for healthcare. A political project is needed for the digital transformation, such as the Energy Union.

Finally, Europe needs to liberate innovation. Industrial policy is about driving competitive growth and innovation, such as promoting business innovation across silos that bring benefits to the whole society.

Caroline Jenner, CEO of JA Europe

As some jobs will disappear in the future due to automation, we need to reinforce human capital with competences related to the co-creation process. According to a recent PWC survey, there is high demand for certain soft skills such as problem-solving, leadership, adaptability, creativity and innovation. The skills that CEOs are valuing most are those that cannot be replicated by machines, also known as "entrepreneurial competences." Experts have been discussing the fourth industrial revolution for some time, but we are still lagging behind on integrating an educational system that supports entrepreneurship.

Although only 11 member states have a comprehensive national strategy for introducing entrepreneurship into education, these countries are already achieving positive results. Education in entrepreneurship at school also serves as an enhancer and enabler of other key competences such as maths, language and digital as well as civic engagement. The best results, at secondary school for example, are with students who report 100 hours of engagement in a practical entrepreneurial experience. Over and above this 100-hour threshold, we are able to impact all 7 competences listed

by the EntreComp framework. Longitudinal research shows that these students go on to enter the economy more easily and, they find employment faster and they start more of their own businesses.

Networks such as the EE-HUB specifically focus on the soft-skills gap and bring partners together to come up with solutions. We need more business people in schools and we need teachers to spend more time in industry. We also need to create more mentoring opportunities for teachers and students rather than traditional guidance counselling. Finally, we think that project based learning, teamwork, engagement with multiple stakeholders and co-creation is the future of work.

The best way to persuade society that automation is necessary is to consistently emphasise and demonstrate how it is transformational and the competences that we need to respond to in order to take maximum advantage of the transformation. The media must also play a role and we have to step up our outreach as actors in the ecosystem. Furthermore, engaging young people's voice directly on these challenges is fundamental to influencing their parents and local politicians. In a recent youth survey, 88% of respondents said quality education matters most to them and two thirds said that young people should learn more about the EU at school. Young people with an education in entrepreneurship were more optimistic about the future of both their country and of the EU. This represents an opportunity for education systems to adapt and focus on the skills of the future because, up until now, school curricula have been unable to keep up with the rapid change in job skills.

Luc Triangle, General Secretary of IndustriAll Europe

European industry faces massive challenges. Digitalisation is of course one of them, but also climate change, energy supply, and the scarcity of highly-concentrated raw materials in a globalised world are others. IndustriAll Europe believes that the EU must lead the transition to a digitalised, low-carbon and circular economy, and be home to the most advanced and sustainable economy and technology. This is the condition for growth for sustainable companies and for quality work.



This transition however generates a range of societal challenges. Firstly, within companies to find adequately skilled workers, secondly on the labour market to establish and maintain employability for all and thirdly at a regional scale, when the dominant industry needs reconversion. A major condition for the success of the transitions of the EU industry is that the societal challenges can be overcome. We need the support and social acceptance of all workers, at all qualification levels, in all sectors and in all regions and Member States.

In order to gain this social acceptance, all players need to anticipate change. A massive investment is required in the re-skilling and up-skilling of workers, by companies and by public authorities. In addition, social protection is needed for all workers, including “atypical” and platform workers, specifically in such times of upheaval and transition. Workers and trade unions must be involved in this discussion on skills and social protection, via social dialogue.

Claudia Olsson, CEO and founder of Exponential AB

Our society is undergoing rapid digital transformation. Exponential technologies are altering the way we live, interact and work at a rapid pace. Due to network effects and a growing global population, which is becoming increasingly connected, the change will likely continue and further accelerate. Rapid technological change requires that we update our education systems and solutions for life-long learning to be able to meet the needs of the stakeholders in the job markets.

There is a need for developing IT-competencies to meet the shortage of IT-skills in European industry and in addition, and a general upgrade of digital skills will therefore be needed.

Tackling the skills challenges will require the development of multidisciplinary programs and various learning alternatives such as practical and condensed training programs for specific tasks and roles.

The responsibility for the development of skills for the digital era will have to be shared between the public sector, the private sector and individuals. Learning will have to be built into employment to a greater extent.

In relation to the fast development of technology, our increased connectivity and the growth of the Internet of Things, cybersecurity will have to be addressed through more coordinated efforts. Capacity building in cyber security will be required to address the rising risks of cyber.

THE DIGITAL REVOLUTION – A CHALLENGING PARADIGM SHIFT FOR EUROPE

Pascale Ehrenfreund, German Aerospace Centre (DLR)

The digital revolution causes a massive change in today's economy and this leads to a feeling of threat, particularly concerning job loss, in public perception.

Recent technological advances have already massively shaken up the industry creating new multi-billion dollar markets. However, that is just the beginning - some of the emerging technologies that are currently in the pipeline are expected to be real game changers: like "digital twins", "smart robots", "Internet of Things", "autonomous vehicles" or "3D printing".

The fourth industrial revolution, very much like its predecessors, drastically compresses value creation chains, reduces production costs and increases productivity. In other parts of the world, this occurring paradigm shift has been recognised and understood and measures have been taken to lead the trend. Despite excellent research facilities as well as great schools and talents, Europe is not managing to keep up in the international competition for innovation.

It often seems like venture capital is what drives the success stories of modern businesses but, ultimately, it is state funded blue-sky research which has led to the disruptive technologies that are currently changing society.

In addition to classic funding instruments like the framework program, a new and more agile, technology-neutral and competition based instrument is needed to foster research and innovation in Europe. We also need to adjust society's mind-set in terms of risk aversion. We need an ecosystem that is not stifled by the fear of failure but driven by the prospect to thrive.

The fourth industrial revolution will fundamentally change our daily lives. The question is whether we want to decide ourselves what our society will look like in the future or have these decisions made

for us in other parts of the world. The Digital Revolution involves all of us and imposes challenges that we can only master together.

STAKEHOLDERS' PERSPECTIVE

SUCCESS STORIES: HOW COMPANIES IMPLEMENT INDUSTRY 4.0

Organised by: EFFRA⁴

This session examined the current industry landscape against a background of transformation. It discussed the role that innovation and digitisation plays in the adaption of new technologies by European industry on the road to industry 4.0 and the challenges that companies and SMEs experience when they attempt to adapt. It also raised the question of how national, regional and European initiatives can support companies to overcome such challenges.

Key conclusions

The workshop has helped participants to better understand today's reality of European manufacturing seen from the perspective of SME and large enterprises, gain insight into how it can be transformed through the application of new technologies, clear examples of the value of European Union strategy and support for collaborative and competitive activities, such as the factories of the future partnership, through inspiring success stories. The insight provided by presenters and input from participants will feed into EFFRA and European Commission industry 4.0 discussions, which includes the future of productions technologies and digitisation of European industry.

What is next?

EFFRA plans to launch a consultation on its next strategic research agenda for the factories of the future partnership and will incorporate input from this workshop. Featured success stories will be widely disseminated, as will those of ongoing Factories of the Future projects, to encourage participation in EU research and innovation and to showcase the achievements of EU-supported research and innovation to citizens.

DIGITAL INNOVATION HUBS – FROM CONCEPT TO DEPLOYMENT

Organised by: Ile-de-France - Region - with CEA LIST⁵

The workshop has addressed the concept and state of play of digital innovation hubs (DIH) including practical examples of how DIHs operate and help SMEs embrace digital transformation, how they interact with regional, national and EU ecosystems and how to improve their impact through coordinated EU, national and regional funding. During the session, DG CONNECT from the European

⁴ Speakers: Željko Pazin, EFFRA (moderator); Björn Sautter (Festo), Cecilia Warrol (Teknikföretagen), Philippe Montfort (Renault), Johan Peeters (Bosch Rexroth), Peter Dröll (DG Research, European Commission), Max Lemke (DG CNCT, European Commission).

⁵ Speakers: Ryan TITLEY, European Regions Research and Innovation Network (ERRIN, moderation); Anne-Marie SASSEN, Deputy head of unit, Department for communication networks, Content and Technology, DG CONNECT; Natalie LEFEVRE, Head of sector "economic development", Ile-de-France region; Gregorio AMEYUGO, Deputy director, CEA LIST; Manuel PARÍS LESTÓN, European Programmes Manager, Axencia Galega de Innovación (GAIN); Thomas HAHN, German National platform on DIH LNI4.0, Siemens; Fabio PIANESI, Manufacturing Industry Digital Innovation Hub project coordinator, EIT Digital; Mauro COLOMBO, Hybrid IT Sales and Presales Manager, Hewlett Packard Enterprise Italy.

Commission presented its actions to support DIHs networks across Europe. The representatives of regions Ile-de-France and Galicia, Research and Technology Organisations (CEA), national and European platforms and the industry including companies such as Siemens, EIT Digital and HPE Italy, provided practical examples of DIHs structuration and activities.

Key conclusions

The panel agreed on the impact of DIHs, while stressing that there remain challenges to be addressed, in particular ensuring a sustainable business model, the existence of a demand expressed by SMEs and the capacity to reach those SMEs needing the support that they can offer.

What is next?

In addition to the coordination and structuring action of the European Commission, which includes ongoing working groups and the launch of several dedicated Horizon2020 calls for proposal for 2018-2020, the ERRIN Network has expressed an intention to organise a follow-up workshop.

EUROPEAN STEEL INDUSTRY MAIN PATHWAYS TOWARDS THE SMART, LOW CARBON INDUSTRY OF THE FUTURE

Organised by: EUROFER⁶

The workshop focussed on how the steel industry is working with other industrial sectors to achieve further progress towards the smart, low-carbon industry of the future. EUROFER, ESTEP and invited speakers looked in particular towards Carbon Direct Avoidance (CDA) and Smart Carbon Usage (SCU) as the main pathways, with the overarching role of the Circular Economy also examined. EUROFER and ESTEP's work on these main pathways forms part of ongoing efforts of steel industry to do its part to transform the EU into a competitive, low-carbon economy. Retaining technical leadership and steel production in Europe, whilst meeting the objectives of the Paris agreement, is the greatest long-term challenge for industry. The steel industry aims to launch a Joint Initiative on steel, which will create new jobs, reinforce the high-skills of European workers and improve the sustainability and digitation of all interlined industrial sectors.

Key conclusions

The technological pathways to CO₂ reduction in the steel sector via Smart Carbon Usage (SCU) and Carbon Direct Avoidance (CDA) contain many projects with different technologies, different timelines and different costs. The diversity of approaches from EU steel producers shows their potential for contributing to a sustainable transition.

The right legislative and economic framework is needed to enable technology implementation, and which ensure that neither new technologies nor existing installations face competitive disadvantages within the internal market or vis-à-vis global competitors, in particular during the transition time.

We need a coherent EU energy strategy that creates a level playing field for the expansion of renewables, and which also applies in general for infrastructure.

The transformation of the steel production in the EU towards carbon neutrality is a huge task. The EU steel industry is fully committed to do its part. It will update its low-carbon steel roadmap in the first

⁶ Speakers: Ralph Sievering, former General Manager, VDEh-Betriebsforschungsinstitut GmbH (BFI, moderation); Axel Eggert, Director General, European Steel Association (EUROFER); Axel Sormann, Senior Expert, Iron & Steelmaking, K1-MET; Mårten Görnerup, Managing Director, HYBRIT; Jean Borlée, Unit Manager, Business Development, CRM group; Michael Hensmann, Head of Department Resource Technology Feedstock, VDEh-Betriebsforschungsinstitut GmbH (BFI); Koen Meijer, Hlsarna Project Manager, R&D Ironmaking, Tata Steel Europe; Markus Oles, Head of Innovation Strategy and Projects, thyssenkrupp AG; Tomas Wyns, Senior Researcher, Institute for European Studies (IES) and Free University of Brussels (VUB).

part of 2018 and is pleading for the development of an overall EU-led Masterplan, which is key for a sustainable transition.

EU steel producers ask for a mission on steel under the FP9 since over the next 10 years, they will have to invest up to €10 billion to reach the innovation stage of the projects. This includes industrial implementation, which would seek the best available techniques that are economically and technically viable. The €10 billion are in addition to the ongoing steel innovations in new steel products, technologies and services. Collaborative efforts are needed to enable steel producers to operate carbon neutral steel production competitively. RFCS is currently only providing up to €40 million on an annual basis and should be primarily kept for research.

What is next?

The technology study will be updated in order to which will serve as a basis for the update of the low-carbon steel roadmap. In addition, the discussion paper "Towards an EU Masterplan for a Low-Carbon Competitive European Steel Value Chain" will be further developed.

ARTIFICIAL INTELLIGENCE: BALANCING BUSINESS AND OPPORTUNITY WITH ETHICS AND RESPONSIBILITY

Organised by: Orange⁷

During the interview keynote moderated by Ms Baker, MM Renda and Demassieux discussed the meaning of Artificial Intelligence, what it can achieve today and how it can evolve in the future. The debate addressed the challenges of machine learning; notably the fact that we can understand broadly how it works, but, less the details of all its decisions; as machine learning doesn't work the way the brain functions. This can raise concerns in terms of responsibility for instance, but it does not mean we should regulate it from the start. However, speakers agreed that work on a responsible AI, tackling biases, should be done, also flagging that AI users should be involved from the beginning.

During the panel on business opportunities for EU industry moderated by Ms Sioli, most participants agreed that the EU should speed up on AI, to avoid lagging behind and become a leader. To do so, Ms Javelot and M Lechelle agreed on the necessity to educate the market to show what AI can bring to the industry and consumers, but also its challenges. Participants also flagged the importance of skills and re skilling in this revolution. The need to involve citizens and increase knowledge and awareness was shared by participants; Ms Javelot called for a trustworthy platform, human-centered AI, as well as tools to control or audit AI biases; M Socuvka considered that policy makers should explain to citizens the meaning and impacts of AI; M Sadek flagged the need to work on certified, trusted and explainable AI to ensure social acceptance and take up; M Lechelle insisted on the importance of security by design and data protection (GDPR) in this matter. Other aspects mentioned to strengthen AI in the EU included: the importance of securing intellectual property of AI (Ms Javelot); the need to strengthen local ecosystems and small businesses to create a sustainable platform in EU (M Lechelle); or the importance for the EU not to be only a consumer of AI but also a producer (M Sadek).

During the last panel on the ethical and societal challenges of AI moderated by Ms Kaili, panellists agreed that understanding, transparency and trust should be developed to achieve a responsible AI and gain acceptance. Ms Boujemaa notably called for a transparency by design principle for

⁷ Speakers: Jennifer Baker (Journalist, moderation); Lucilla Sioli (European Commission, DG Connect, Director Digital Industry, moderation); Societal challenges: Eva Kaili (Member of the European Parliament, moderation); Andrea Renda (CEPS Senior Research Fellow); Nicolas Demassieux (Orange Senior VP Research & Labs); Bénédicte Javelot (Orange Chief Strategy Officer); Ondrej Socuvka (Google EU Senior Public Policy Manager); David Sadek (Thales VP Research, Technology and Innovation); Yann Lechelle (SNIPS COO); Nozha Boujemaa (INRIA Director of Research); Liam Benham (IBM Europe Vice President, Government and Regulatory Affairs); Laurent Zibell (IndustriAll European Trade Union, Policy Adviser, Industrial Policy) European Parliament).

algorithms ensuring fairness and equity in AI and indicated that robustness and accuracy of big data and AI techniques should also be mastered. M Benham and Zibell concurred on the need to improve transparency on how algorithms reached decisions; on the sources of the data and on how AI has been trained. M Benham also mentioned that AI is there to complement and not replace humans; the latter will always have to remain in control. Considering that AI-based products can permanently evolve, to avoid losing control on a given product, M Zibell deemed that there should always be a relevant mechanism to stop it, a sort of kill switch. On jobs, M Benham indicated that some may no longer exist while new jobs will be created, but, what is sure is that all jobs will change in the future. M Zibell agreed that AI won't be successful if workers are not properly trained.

Key conclusions

AI is a game changer that will substantially modify the way people, and businesses, function and work. The EU cannot miss that revolution and should speed up its work on AI to take the lead. AI raises numerous challenges that need to be tackled to ensure social acceptance and a wide and successful development in the EU. These include: improving awareness and transformation needs for the industry, anticipating its impacts on tasks, workers and citizens, developing a responsible AI, by involving users from the start, improving transparency and understanding of AI and tackling its biases.

What is next?

The Commission has launched a call for an EU platform on AI and the deadline for applications is 17th of April. It will adopt its strategy on AI by the 25th of April.

FACILITATE THE UPTAKE OF NEW TECHNOLOGIES BY TRADITIONAL SMEs

Organised by: UEAPME⁸

This session discussed challenges, problems and the needs of SMEs as well as the actions that need to be taken to improve it. The contribution from an EU level included discussions on regulation, programmes, best practices and awareness.

Key conclusions

The regulatory problems that were raised included gold plating and the differences in implementation of directives leading to barriers within internal market, thus making innovation more burdensome and costly, and SMEs having difficulty in accessing data controlled by big players. Secondly, concerning EU Programmes, it would be of utmost importance to continue with programmes and initiatives such as COSME, Horizon 2020 and EEN. Furthermore, regional funds should support SME, innovation and new technologies and more support is needed at national and regional level. This could include access to technology, qualifications, new markets and finance, consultancy support to manage changes and new technologies, information and raising awareness about technology changes, availability of networks, clusters, competence centres or supply chains and access to and the availability of infrastructure.

⁸ Speakers: Véronique Willems, UEAPME Secretary General (moderation); Ulrike Rabmer-Koller, UEAPME President; Damiano Pietri, ABC Bilance, Italy; Anne Lenaerts, NOFF, Belgium; Alexander Barthel, Chamber of Skilled Crafts in Germany, Competence Centre for Digitalisation; Claudia Scarimbolo, SME DIGITAL Initiative, Austrian Economic Chamber; Martin Bornschein, KfW, German Promotional Bank supports SMEs with financial instruments; Martine Diss, DG GROW and Doris Schroecker, DG RDI; Gerhard Huemer, UEAPME Director Economic Policy.

What is next?

A presentation on good practices to support digitalisation in SMEs to Commissioner Bieńkowska was made on 27th February, as well as a presentation of policy recommendations. UEAPME workshops on good practices in the area of support for digitalisation for SME association will also be held.

REGIONS AND INDUSTRY: PARTNERS FOR GROWTH AND JOBS

Organised by: European Committee of the Regions & Industry4Europe coalition⁹

European industry faces big global challenges nowadays. On a global level, it is still place-based and its competitiveness relies on the regional and national framework conditions. European regions and industry associations want to work together on long-term competitiveness of European industry and there are already many examples of successful cooperation.

Key conclusions

However, an EU-wide long-term vision and goals, together with realistic action plans are needed to drive the industrial transformation by 2030. Both industry and the regions should be at the top of the European agenda for the next years. This should be reflected in the multiannual financial framework, including in the Cohesion Policy and other sources of funding. These sources should be better coordinated and result-oriented, aimed not only at research activities but at product-level innovation. They should also take into account place-based specifics. The smart specialisation approach proves especially useful, also in terms of interregional cooperation needed to improve the position of European players in global value chains. Good examples of such cooperation can already be seen in Thematic Partnerships for Industrial Modernisation working to stimulate interregional cooperation and investment in regions with matching smart specialisation priorities. Another important issue is how to address societal and environmental impacts and challenges caused by industrial development. For example, companies following decarbonisation strategies face problems connected with changing legislation, access to finance and competition from countries where companies are not required to comply with ambitious standards. Such issues should be appropriately addressed by multi-level public and business dialogue that will set viable transformation paths. Other important challenges include the creation of business-friendly environments all over the EU, development of physical and digital infrastructures, sustainable access to resources at reasonable price and skills and training for industry 4.0. Many of these issues cannot be solved without the strong involvement of regional governments who should be seen as key partners for place-based industrial transformation.

What is next?

We must develop an ambitious, forward-looking industrial policy strategy that directly relates to the competitiveness of European industry in a global context. This should include a place-based approach as regional ecosystems are crucial and need the active engagement of industry partners.

⁹ Mr Heinz Lehmann (Germany), Member of the Saxony Parliament, rapporteur of the CoR Opinion on a European strategy for industry; Ms Jeannette Baljeu, Member of the Council of the Province of Zuid-Holland, Member of the Committee of the Regions; Mr Philippe Citroën, Director General of UNIFE, initiator of the Industry4Europe coalition; Mr Dirk Fincke, Secretary General of UEPG, Dr Monika Matusiak, Joint Research Centre, European Commission.

EU INDUSTRIAL LEADERSHIP: THE CRITICAL PATH TO SUCCESS FOR EUROPEAN CLEAN-TECH SOLUTIONS

Organised by: EIT InnoEnergy¹⁰

This session focused on the key opportunities and challenges for innovators in Cleantech in Europe and the ways in which various players along the innovation value chain such as RTOs, VCs, industrials, EU instruments and programmes and regulators serve the needs of the entrepreneurs. It also raised the questions of what should be done and is already under way to ensure the leadership of the European Union in Cleantech.

Key conclusions

A solid foundation of Education and Research is essential to gain more success stories from brilliant entrepreneurs. In this respect, Europe has essential assets to claim, notably high-skilled engineers, top level RTOs and researchers and it is leading in terms of patents and of publications, as well as the biggest Research programme in the world Horizon 2020. However Europe falls behind in terms of the commercialisation of its technologies. In this regard, policy has a crucial role to play in creating demand and markets. It is not frequently said, but Tesla would probably not exist without the 465 million dollar loan that it received from the Department of Energy of the US in 2010. There are still hurdles in Europe compared to the rest of the world. As an illustration, in terms of funds raised from venture capitalists between the EU and the US the ratio is 1 to 5. It is not only a matter of volume in total, but also a matter of the average size of the VC funds in Europe.

Hopefully, the EU is evolving towards a better commercialisation of innovation, thanks to stakeholders like the EIB or EIT InnoEnergy, but it should continue to be supported. For this reason, Europe needs to invest more on breakthrough markets that create tools, departing from the one-size fits all approach in the current Framework Programme, by providing a tailor-made support to entrepreneurs and seamlessly combining loans, grants, and equity, in a long-term perspective with milestones. From this perspective, the European Commission has the intention to work with partners, such as the innovation agencies, the VCs, the business angels, and of course, the European Institute of Innovation & Technology's Knowledge & Innovation Communities (KIC), which play an essential role in developing the entrepreneurial skills in Europe. Being a good scientist and being a good entrepreneur are indeed two distinct things.

In addition, a marriage between finance and science is necessary, to make available massive and fast money in Europe to support innovation. For now, it is difficult to raise money in Europe for funds that will invest in mature technologies, while there is a need of more long-term and patient funds for the growth phase. For this reason, the European executive is preparing VC funds, which should leverage at around 1.6 billion euros in Deep Tech.

Money cannot buy the ticket to cross “the valley of death” however. Technical expertise, market vision, and help in structuring the company towards industrialisation by hiring suitable people are services offered by the ecosystem to entrepreneurs. Industries also have a key role to play, notably to sustain the ecosystem and to give confidence to large investors. For instance, Enel built a photovoltaic farm in Latin America, equipped with Chinese panels, Spanish trackers and Italian inverters. Europe is still very strong in technology.

Furthermore, politicians should put in place a clear, long-term oriented, ambitious and stable regulatory framework for 2040-2050, and allow the researchers and entrepreneurs to play their part

¹⁰ Speakers: Diego Pavia, CEO, EIT InnoEnergy (moderation); Taavi Mädirik, Co-founder CEO and director, Skeleton Technologies; Christophe Gégout, Deputy CEO, CEA; Nicola Melchioni, Head of European Public Affairs & Regulation, Enel; Jean-David Malo, Director of Open Innovation and Open Science, DG RTD; Lionel Cormier, Managing Partner, Demeter; Martin Kern, CEO, European Institute of Innovation and Technology (EIT); Henna Virkkunen, MEP (Member of ITRE Committee), European Parliament.

of the game. The battle for Deep Tech for decarbonisation is on, and the EU is well positioned to fight.

What is next?

EIT InnoEnergy, together with its partners, will take the conclusions of this event into consideration to produce a set of recommendations aiming at improving the EU innovation support for clean energy technologies, which eventually bring the energy transition to life.

TESTBED EUROPE – ACCELERATING INNOVATION AND STRENGTHENING ECO-SYSTEMS

Organised by: RISE/Teknikforetagen¹¹

RISE the Research Institutes of Sweden and the Association of Swedish Engineering Industries (Teknikforetagen) brought together a number of technology experts to discuss the details of a European test bed strategy. This event builds on a series of initiatives aimed at improving access to these test beds, which are crucial for speeding up the innovation process.

To open proceedings, the panel was first asked about their experiences of test beds. Petra Sundström from outdoor power tool manufacturer Husqvarna Group began by saying that that 'going digital' offers a lot of opportunities for traditional manufacturers, but that it can be hard 'knowing where to start'. She also underlined that test beds are an opportunity for companies to test without legislative constraints.

Anna Olshäll from vehicle manufacturer Scania added that she sees 'learning arenas' as critical for helping test bed operators make the most out of the cutting edge technology. She highlighted the importance of test bed security to avoid information corruption, which, could ruin the product being manufactured and crucially, negatively impact safety standards. Giulia Gregori from Italian biodegradable materials firm Novamont, said she would like to see an environment where the qualities of bio-based products could be tested and showcased to her customers, who are often tempted to use less advanced products as they cost less. Meanwhile, Åsa Fast-Berglund from Chalmers University said that from her first-hand experience of working on test beds, there are synergies between SMEs and global companies, adding that 'hungry and innovative' PhD students can teach a thing or two to multinationals. EARTO's Muriel Attané highlighted the importance of securing funding under the next phase of the EU's budget. She added that a clear strategy from all stakeholders pushing for a Test Bed Europe is critical. The EU and Member States need to work together closely in this regard. Lula Rosso from VTT emphasised that achieving a Test Bed Europe would require local partners, excellent infrastructure, human interaction and high-level expertise. To this end, diverse funding instruments are required.

The panel then spoke about test bed challenges they face with Sundström stressing that in order to compete in the marketplace against the likes of Google and Amazon, it is vital to run proof of concept and not be tied down by the General Data Protection Regulation (GDPR). 'What we need right now are free cities, in which we can innovative, experiment, and be competitive - this is where test beds would help', she said. Gregori also pointed to legislation as hampering innovation. She views test beds as important for customer transparency, which would enhance trust in the new products her company is developing.

The focus then turned to partnerships, with Olshäll saying that Scania is willing to open up its existing test bed to other companies, adding that this is essential to keep abreast of developments. It was agreed that most Swedish companies are open to sharing their knowledge. In fact, according to Fast-Berglund, individual companies cannot innovate alone; they need to work together with both SMEs

¹¹ Speakers: Jenny Sperens, RISE (moderation); Petra Sundström, Husqvarna; Muriel Attané, EARTO; Lula Rosso, VTT; Anna Odehäll, Scania; Åsa Fasth- Berglund; Chalmers University; Giulia Gregori, Novamont.

and multinationals. However, the same cannot be said for the rest of Europe. ‘In Italy, we need to think globally,’ said Gregori. Many traditional Italian companies should visit centres of excellence elsewhere in the Europe for inspiration. A long-term strategy is also required, she added. Attané maintained that Research and Technology Organisations (RTOs) have problems working with SMEs on test beds due to a lack of budget and other resources. She therefore urged bigger companies to open up their facilities so that SMEs can also avail of this expertise. Rosso, meanwhile, called on regions across Europe to work together and to pilot networking models such as the Vanguard Initiative.

Key conclusions

The event concluded that collaboration between big and small companies is key, legislation on test beds should be minimal to encourage innovation and that test bed cities are crucial. It also concluded that the skills of operators, managers and directors of companies to which test beds can contribute need enhancing and a set of common standards at European level is necessary. Finally, it was mentioned that funding shall take into account real working models and needs and that data must be handled appropriately in order to maintain trust.

What is next?

Continue the dialogue with the Commission services, stakeholders and Member States to seek to realise Test bed Europe.

IMPROVING ENTREPRENEURSHIP THROUGH SOCIAL ECONOMY AND S3

Organised by: Government of Navarra¹²

The European Social economy comprises of 2 million enterprises and represents 10% of all European enterprises, while employing over 14 million paid employees. The 2021-2027 Multiannual Financial Framework (MFF) is expected to prioritise the EU’s continued drive to support innovation-oriented growth. The social economy should form a critical part of this drive. At the same time, more than 120 regions have developed their Smart Specialisation Strategies (S3). This workshop will explore how to combine the efforts of S3 and the social economy to optimise efforts in achieving smart, sustainable and inclusive growth. This vision is already recognised by many EU regions. The time is ripe to better define and position the role of the social economy in the EU’s future S3 agenda. The workshop seeks to find common links between the EU’s social economy and S3, and how these can foster and optimise new directions for EU entrepreneurship.

Key conclusions

There remain key challenges in supporting the visibility and capacity of the sector to play a full and effective role in the EU’s industrial revival but there are many excellent examples of how the social economy sector adopts highly creative and cooperative approaches to working with regional partners to deliver social impact. The ambition of Navarre region is to extend and consolidate this good practice by seeking out interest from other EU partners to build the capacity of the sector through inter-regional collaboration. Both the S3 policy agenda and EU cluster models offer routes to explore and develop this, and to transform existing good practice into a broader EU drive to optimise the performance of regional innovation ecosystems.

¹² Speakers: Alison Hunter, Economic and Public Policy Consultancy (moderation); Patrick Klein, Team Leader for Social Economy, Clusters, social economy & entrepreneurship, DG Grow (European Commission); Manuel Palazuelos, S3 Platform, JRC (EC); Ilari Havukainen, Cluster Development Manager of Regional Council of Lapland; Mikel Irujo, Delegate Navarra in Brussels and COR member; Alain Coheur, Vice-president Social Economy Europe; Barbara Moreschi, Coopfond (Cooperatives Europe); Miguel Ugalde, Mondragon Corporation, CEO MAPSA; Tanja Häyrynen, Arctic Smart Rural Communities Clustersultancy (EPPC).

What is next?

The call for a Partnership on Social Economy within the thematic platform on industrial modernisation will explore how to combine the efforts of S3 and the social economy towards smart, sustainable and inclusive growth. This vision is already recognised by many EU regions and could help to better define and position the role of the social economy in the EU's future S3 agenda.

CONSTRUCTION – TOWARDS AN INCLUSIVE DIGITAL STRATEGY

Organised by: Committee for European Construction Equipment¹³

This session focused on the issues of defining digital construction and digital platforms, the opportunities and threats of digitalising the sector and how digital construction can be used as a tool to increase our productivity and safety whilst also also reducing our environmental impacts. Ways in which we can catch up with the worldwide technological trends and appliance of digital tools as well as the type of interaction with policy makers at EU level is needed, were also discussed.

Key conclusions

The workshop raised the profile of the construction industry by tackling the most relevant trend in the sector and contributed to a better understanding of the concept of digital construction. It has also provided insights into the potential of the digital technology for improving productivity within the construction sector.

The stakeholders concluded, the construction value chain should continue to work together with the European Commission (DG GROW and DG CONNECT) towards the common goal of developing a digital platform for the construction sector. H2020 financial support under the Digitizing European Industry initiative is key for the uptake of this initiative.

Most of all, it was a great success as for the first time, four organisations of major industries (CECE, Construction Products Europe, FIEC and EBC) representing the entire value chain got together and discussed digitalisation.

What is next?

The Industry stakeholders are ready to take the lead in digital construction. A political Manifesto on Digital Construction is being drafted and a large industrial cooperation consortium will present a bid for the first H2020 Call to establish a Digital Industrial Platform for construction.

UPGRADING EU AGRIFOOD INDUSTRY TO THE DIGITAL AGE: SMART SENSOR SYSTEMS 4 THE AGRI-FOOD

Organised by: Flanders Food¹⁴

The workshop focussed on several different topics including: discovering the expertise that is available in the regions on smart sensor technologies, digitization, IoT and industry 4.0 for agrifood, discussing how regions are organised to accelerate the uptake of these new technologies by agrifood companies and evaluating the support that exists for these companies.

¹³ Speakers: Maria RIBEIRINHO, McKinsey (moderation); Riccardo VIAGGI, CECE Secretary; Emil KARANIKOLOV, Bulgarian Minister of Economy, EU Council Presidency; Fulvia RAFFAELLI, Head of Unit, DG GROW; Max LEMKE, Head of Unit, DG Connect; Enrico PRANDINI, CECE President; Kjetil TONNING, FIEC President Elect; Cédric de MEËUS, LafargeHolcim, Construction Products Europe; Philip VAN NIEUWENHUIZEN, EBC.

¹⁴ Speakers: Veerle Rijckaert (Flanders' FOOD), Leo Van de Loock (Transition manager industry 4.0, vlaio), Alasdair Reid (Reid consulting), Domenico Tinelli (R&D Project Manager, ITG).

Key conclusions

The workshop presented a good way to understand and visualise the complexity of the innovation process which includes several steps despite being an open system. The funnel that was presented reflected well the power and necessity of collaboration in the innovation process. It was mentioned however that more funding schemes that can combine regional and national funds with EU funds are needed.

The stakeholders concluded that living labs are an important tool to stimulate digitization of food business and they need to be embedded in a full service package for the Agri-food industry. They also mentioned that integrators, technology developers and end-users should all collaborate from an early stage to ensure successful uptake of innovative technological solutions. New business models also need to be considered and technology should be seen as a service rather than simply large investments and, in addition, data connectivity to connect all sensor systems is crucial.

What is next?

To further support the S3P strategy, a roadmap and implementation plan to further enrol a European network of living labs of smart sensor systems 4 agrifood is in the process of development. The platform is preparing a sub-section of the COSME project and the outcomes from the round table discussions in the workshop will be used to complete the S3P scoping note that will serve as a basis for the project. The COSME project will include following actions: strategy and roadmap development, establishing an interregional platform of living labs and organise study visits, organising interregional demo case studies and setting up generic business models, and raising awareness of the agrifood industry.

Support mechanisms are being established to facilitate access for SMEs to the living labs and the platform is considering submitting a project proposal for new industrial value chains. Strengthening the platform and increasing the European coverage by searching for new regions and relevant stakeholders, such as the food industry, machine producers, technology integrators and investors, is also being promoted at various European platforms and events.

EU LEADERSHIP IN CLEAN ENERGY & CLEAN MOBILITY TECHNOLOGIES - THE STRATEGIC ROLE OF ADVANCED MATERIALS

Organised by: Energy Materials Industrial Research Initiative¹⁵

The cost of clean energy and clean mobility technologies must continue to decrease in order to ensure their adoption and deployment across EU in frame of Energy Union. This is made possible by a reduction in cost, an increase in performance, and an extension of lifetime of the Advanced Materials.

Key conclusions

In order to achieve such goals, present support for Advanced Materials in clean energy needs to be further reinforced. Despite being at the heart of all clean energy and clean mobility technologies, and representing more than 50% of the cost of these technologies and accounting for 50% of all jobs in clean energy and clean mobility value chains, innovation ecosystem in this area received only 15% of the Horizon 2020 funding. This should change under FP9 in order to boost innovation in clean energy

¹⁵ Speakers: Martin Porter, Executive Director, i2-4c association (Industrial Innovation for Competitiveness, moderator); Fabrice Stassin, Managing Director, Energy Materials Industrial Research Initiative (EMIRI); Kurt Vandeputte, Senior Vice President Rechargeable Battery Materials, Umicore; Jeroen Bello, Global Automotive Marketing Manager, Dow Chemical; Ludovic Odoni, R&I Director Belgium, Solvay; Niels Schreuder, Manager Public Affairs, AGC Glass Europe; Philippe Thibaux, Technology Manager Metal Structures Centre at Arcelor Mittal Global R&D, Arcelor Mittal.

& clean mobility, develop industrial competitiveness, and create economic opportunities for European citizens, which is the mission at the core of VP Maroš Šefčovič's «Clean Energy Industrial Forum» on batteries, renewable energy and construction. Regarding batteries, industrial & innovation actors will present 20 priority actions in support of EU battery alliance. EMIRI contributed to actions on advanced Li-ion and solid-state batteries as they have Advanced Materials at their very heart, building upon our previous work and recommendations in Integrated SET Plan.

Plug-in hybrid electric vehicle (PHEV) and battery electric vehicle (BEV) market by 2025 is forecasted at 650GWh (roughly 10 fold increase compared to 2015). Roadmap Advanced Materials is focused on NMC with higher Ni content, lower Co and advanced Li Ion chemistries based on improved cell design and higher operating voltage. Therefore there is a need for consistent support needed for creation of local markets, increased focus for R&I to prepare EU for industrialisation, encourage and facilitate creation of EU battery value chain project of common interest, promotion of sustainable and responsible sourcing of raw materials and fully circular economy.

The Solvay transformation over the last 6 years to a multi-specialty chemical solution provider with a specific focus on sustainable mobility and aerospace is an interesting example.

There is also a need for definition of strategic axis and value chain in Europe. The EU needs to be in the race for investments for battery materials and increase its spending on R&D. To do so, a milestone approach is needed with less administrative burden in the projects. We should go beyond proof of concept, create new business at TRL+6. Industry should become decisive partner in reinforced PPP structures. And innovative incubators need to act as a network rather than as independent actors.

60% of sales addressing big world challenges with a particular focus on sustainability including water scarcity, improved food packaging and a reduction of energy consumption. In transportation, activities are concentrated on a greener, connected and safer world.

Glass is a strong innovative material with 50% of the products to be marketed in the next 10 years that do not yet exist today, following examples of insulating glasses, PV glass panel innovations, building-integrated photovoltaics, automotive roof glasses and smart tinting materials. There is a need for a clear EU Industrial Policy that would result in EU based installations and investments, earmarked R&I programs and measures to tap the energy efficiency in buildings, cars and infrastructure.

Also steel can contribute to the future energy mix and electromobility. As an example, the new Tesla offers the most competitive light weight steel solution in the most cost efficient design. Wind turbines require high strength steels with improved fatigue and corrosion resistance. Continuous reliability improvements are requested and design codes and new guidelines for the transition to new materials are necessary. The EU help however is needed for new steel materials for low energy harvesting. There is also a need for more collaborative projects for the steel industry as well as the establishment of a supply chain for structural components. Good examples of this are present in the Horizon 2020 programme.

What is next?

The EMIRI workshop held during EU Industry Day was a success in terms of its coherence and the powerful messages that were voiced by key industrial players such as Umicore, Solvay, Dow Chemical, AGC Glass and Arcelor Mittal. All speakers asked the European Commission to pay closer attention to Advanced Materials in FP9 if the EU is to profit from this strong opportunity generated by Europe's transition to an Energy Union.¹⁶

¹⁶ All documents are available at <http://bit.ly/2CfL3Wf>

DIGITAL MEETS ENERGY UNION MEETS CIRCULAR ECONOMY

Organised by: Orgalime¹⁷

This session focused on the following questions and issues: technology manufactured in Europe for the world and what's in it for Europeans? What are the opportunities and benefits of ongoing digitisation in times of building the Energy Union and Circular Economy for individual citizens, professional users and society as a whole? Data – how does it fuel our economy? How to build social acceptance? What will be needed to protect our citizens and/or industry? How to remove barriers to investment and build trust in the market? How well does Europe do in comparison to other major players, in particular China? How to keep Europe on track? What would be the consequences of not acting?

Key conclusions

Digitisation: It is clear that digitisation offers many opportunities for simultaneously boosting resource efficiency, energy efficiency and productivity throughout the economy, and that it enables many new, innovative technologies, systems and business models to realise the energy and circular economy transitions. However, a number of challenges must be addressed, starting with rolling out the underlying infrastructure for these transitions. As data flows increase, robust data management and cybersecurity rules will become crucial in protecting consumers and industrial stakeholders alike. Moreover, the issue of skills was raised as a key priority: it will be vital to ensure that current and future employees of Europe's industrial firms and ever more active consumers will have the necessary skills for the digital age.



Energy: Digitally enabled technologies contribute to successfully managing Europe's transition to a modern clean energy system with ever more distributed energy resources. Smart building systems can lower carbon emissions, produce electricity on-site, thereby saving on energy costs and making life more comfortable and convenient for citizens. Smart appliances, too, can reduce energy consumption and lead to lower household bills. However, the challenge will be to create the right framework in Europe's electricity market that will support flexibility: to improve consumers' uptake of these smart technologies, they must be able to see the benefits in terms of cost.

Circular Economy: Digitalisation enables optimising the use of our resources throughout the economy. The digitisation of production lines is enhancing resource efficiency by cutting down on material inputs, water or energy input and waste generation, while the fusion of data with Europe's manufacturing strength drives the development of new business models.

¹⁷ Speakers: Sonja van Renssen (moderator); Andrea STRACHINESCU, DG Energy; Jean-Jacques MARCHAIS, Schneider Electric; Naemi DENZ, VDMA; Viktor SUNDBERG, Electrolux; Monique GOYENS, BEUC; Luc TRIANGLE, IndustriAll; Malte LOHAN, Orgalime; Tomas HEDENBORG, Orgalime.

What is next?

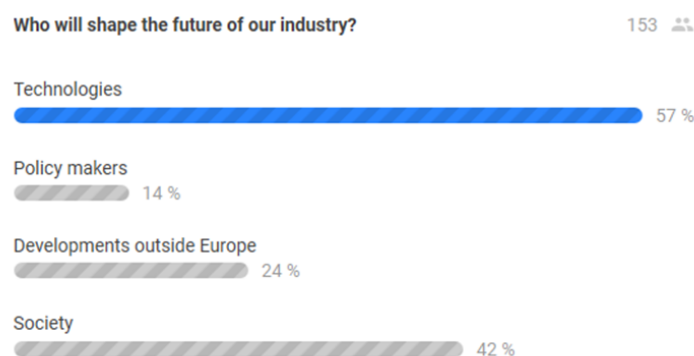
Turning challenges into opportunities for Europe, its citizens and industry alike, is now the issue. A joined-up approach, stakeholder dialogue and cooperation will support Europe's sustainable future and the successful management of the digital, energy and circular transitions. On the regulatory side, the main barriers preventing these innovations from happening in Europe range from issues such as infrastructure investment, data management or cybersecurity. The EU tech industry continues to stand ready as a partner to support these transitions.

III. DAY 2

ROAD TO 2030 – THE FUTURE OF EU INDUSTRY IN GLOBAL ECONOMY

Moderator: Angela Wilkinson, Senior Director, World Energy Council

A common vision is needed - not top down blueprint but an enabling platform for dialogue, with many elements. It should be built on the following principles: shift from volume to value creation; an economic paradigm shift from growth for some to well-living for all; is a measurable goal of 20% GDP by 2030 really inspiring (does it reinforce the growth paradigm); vibrant SMEs; a strong common market; and technology choices exercised so that robots augment human labour and free more to be creative and collaborative in solving their local as well as global problems.



At the same time there are multiple drivers of transition in which EU industrial strategy and policy will either succeed or fail and digitalisation is one of them. This does not just refer to robots and AI but also convergence of other technologies and uncertain pace of innovation. Deflationary abundance is another, in terms of its implications of free-to-all digital enterprise on taxation systems and the social contract. Thirdly, demography that is related to ageing Europe with possibilities of urban depopulation and decarbonisation relating to climate mitigation and also adaptation to climate-FEW nexus of European energy systems, dematerialisation and decentralisation can be considered as other drivers.

In addition, reindustrialisation should be about dynamic ecosystems with vibrant SMEs, not just big companies. There are implications for a more distributed approach and processes of collaborative innovation at different scales. Scalability is not about replicability and economic efficiency, but rather about transplanting the power of good ideas or new solutions from one place to another. Technology choices matter so that robots augment human labour and free more to be creative and collaborative in solving their local as well as global problems. And finally, the EU must build collaborative advantages within and beyond the region. Europeans, soon being only 1 in 10 of global population, must grow with others. We must address interoperability and maintain a common market.

Saori Dubourg, Member of Executive Board, BASF

Industry is undergoing a transformation process, responding to the world's societal needs with respect to climate change, circularity, and overall sustainability. Resources are at the centre-stage, requiring a shift from a volume-driven to a resource-driven economy.

Another transformation of industry has its roots in digitalization, as technological change and the shift to a data-driven economy impacts the way we produce, innovate and sell our products, requiring consistent and modern IT infrastructure.

Last but not least, social development will be key in the future: successful business means not only creating wealth, it means creating value. Too often we have forgotten to speak about values. We have to make sure we include people and create value for everyone.

To be successful on a long-term basis, we have to think and act more European both for the future of Europe and for the future of EU industry in a global world. We also need predictability and reliability. With our European chemicals industry association, Cefic, we have defined seven priority areas for action:

- Energy and climate policies must be made cost competitive;
- EU policies in all areas should be conducive to fostering innovation; the innovation principle should be implemented;
- A new focus on value chains is key to understanding industrial added value;
- Great care is needed when defining overarching policy concepts, like the circular economy;
- Digitalization must be supported by EU policies;
- Greater coordination and inter-operability of key infrastructure is needed;
- The EU should ensure an ambitious, balanced, free trade and investment agenda with key trading partners and open markets in general.

Ulrike Rabmer-Koller, Managing Director Rabmer Group, President of UEAPME

About 2.1 million enterprises are active in the industrial sector, and 99.4% of them are SMEs. Therefore, there needs to be a specific focus on SMEs within a renewed EU Industrial Policy Strategy. UEAPME supports a horizontal industrial policy approach. The overall goal is to improve the framework conditions for businesses of all sizes, whilst strongly taking into account the importance of SMEs. At European, national and regional level, industry – and in particular small and medium-sized enterprises - should be enabled to tackle present and future challenges, including the transformation to safe and sustainable technologies.

Appropriate framework policies must be coherent with other policy fields like competition, climate and energy policy. Accompanying sectoral initiatives should focus on sectors with high growth potential or sectors facing economic challenges or significant change.

National economic policy activities are necessary to support EU policy initiatives. The role of Europe is identified as that of a coordinator and catalyst: bringing together stakeholders and diffusing knowledge and ensuring all countries speak with a single voice, for example in areas like international trade agreements, patenting and energy markets.

The competitiveness of the EU industry is directly dependent on its ability to continuously adapt and innovate by investing in new technologies, digitalising its industrial base and transitioning to a sustainable low-carbon and circular economy.

During the Industry Day, UEAPME organised a workshop on how to “Facilitate the uptake of new technologies by traditional SMEs” to show how to support SMEs in the fast changing world, including the digitalisation process. SMEs will thrive with the appropriate framework conditions regarding the digital, green and circular economies, which is why awareness raising and support structures are crucial in helping SMEs catch-up with these global trends.

Märtha Rehnberg, Co-Founder & Partner DareDisrupt

From ‘jobs created’ to ‘problems solved’ and looking ahead to 2030, we have both the luxury of time and technological tools at hand, with which we can develop further in terms of defining a prosperous and thriving EU Industry. We must understand that job creation leads to success. We must consider how we can better integrate the UN Sustainable Development Goals (SDGs) in industrial policy both as a measurement of success.

From linear to exponential Industrial Policy, digital technologies blur what once was, clearly defined industry borders. Digital tools empower an increasing amount of people to bring about their ideas to industries that previously were hard to penetrate. We are moving from an age of division of labour to the digital divide. So when we outline industrial policies for the manufacturing sector for example, how can we, in a digital age, define its border? The manufacturers of tomorrow are to be found in the software industry, in advanced materials and biotech and in the arts. When we talk about investing in skills, we must demonstrate ‘technological intuition’ which is the understanding of technological signals, how they impact and penetrate existing sectors, and where sovereign funds in the shape of public procurement for innovation.

Technopolicy is foreign policy and the EU has a unique opportunity to demonstrate a model for ethical development of technology. We stand in between a model in which technology is driven undemocratically by a strong state, or liberally but undemocratically in the realms of the “free market”. In between these two extremes await a new model for technological development which we must develop, showcase, and export. Technology holds the answers to solve the biggest issues of our time, but its purposeful development depends on our ability to integrate it within and amongst our constituents.

Heinz Lehmann, Vice-President of the Committee of the Regions, Rapporteur on industrial policy

The future of European industry will be shaped by the forces driving digitalization. Regions need to maintain and develop their industry as it is the main source of prosperity and employment. This requires a strategic orientation and smart specialization in areas of competitive strength. Better cooperation across Europe of regional clusters is needed to create complementarities and achieve critical mass, and EU instruments are crucial for this.

To preserve and further develop European technological sovereignty, investment in key enabling technologies (KETs) and important projects of common European interest (IPCEIs) will continue to be indispensable.

The EU's industrial economy is characterised by significant regional disparities. Policy initiatives at EU, national and regional levels need to be better adapted and coordinated to ensure that industrial modernisation is much more broad-based from a regional point of view. Cohesion policy will continue to be essential for supporting the industrial modernisation of all European regions and promoting industrial competitiveness more generally. Ensuring that the necessary resources continue to be made available and that they support investment in the right areas and with the right instruments are key challenges. Investment in infrastructure, innovation and skills must be prioritised together with support for developing and inter-linking place-based ecosystems and regional clusters. SMEs should also be supported, particularly in the field of digitalization.

A place-based approach is needed. Regional and local authorities are indispensable in guiding the shift towards industrial modernisation. As regional ecosystem partners, their competences for research and innovation, education and skills, export support, infrastructure, SMEs and regulation are all crucial for industrial development and ensuring embeddedness.

Renato Pacheco Neto, Chairman, Worldwide network of EU chambers of commerce and industry

EU Chambers of commerce and Industry in third countries have a key role to play. As the Chairman of EBO WWN, I can assure you that, with 40 EU Chambers worldwide, we fully comprehend the industrial challenges and opportunities, the business and investment environment on the ground in third countries and the pertinence of their annual position papers stressing the difficulties encountered by European businesses. We are able to make recommendations to solve these problems. Helping the setting up, scaling up and networking of EU Chambers abroad is important, and we must recognise that EU chambers are fundamentally business initiatives that are organised by them. In addition, developing a "financial arm" of economic diplomacy with a new financial instrument to support access to finance for the internationalization of European businesses is essential, as what we do in Europe will have to be on the same level as our main competitors, namely China.

Furthermore, ensuring maximum utilisation of the Free Trade Agreements (FTAs) is crucial, as European Businesses, in particular SMEs, are not always aware of the opportunities arising from FTAs, nor are they informed enough about how to use FTA provisions and benefit from preferential rates when exporting to third countries. Raising awareness through a variety of channels is therefore essential and the future of trade policy and FTAs depends on it.

Enhancing EU investment in third countries will facilitate the internationalization of European businesses, for example via the EIB External lending Mandate, and foreign investment in the EU, via EFSI. It will also ensure co-investment by the EU and a third country to have more impact vis-à-vis another third country, via, for example, the EU External Investment Plan.

Leida Rijnhout, Steering Group Member of SDG Watch Europe

Civil society is underrepresented in important decision making processes. Governments are giving away their mandate to big businesses which is increasing EU-scepticism, as people don't want a Europe that represents businesses interests only.

 **Ignacio J. García Gimeno**
@ijgarciajimeno

Follow

"For Europe to lead the next wave of innovation, we need a new force of momentum.

In my mind, I see it almost like the propeller of a plane, with three strong blades: the first is Science; the second is Start-ups; and the third is Industry"

@Moedas at #EUIndustryDay 🌟🌟🌟



Carlos Moedas @Moedas
A new wave of innovation is arriving and it will bring huge opportunities for #EUIndustry. Our scientific strengths will be a huge asset. From #AI, to #biotech, to two dimensional materials – they all require leading edge science. #EUIndustryDay...

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We acknowledge that industries have a huge role to play, but we simply don't want them to define the rules of the game. We need better, but not necessary less, regulation in order to re-organise our market. This is also what the 2030 Agenda demands.

We should challenge our "economic growth" model: this is causing too much environmental damage and social disasters. We should focus on well-being within the limits of the planetary boundaries, and respecting a fair share for all countries. Too much burden is now put on countries in the Global South. Corporations and their CEOs should be held accountable for what they do. Furthermore, industries should behave like any other citizen- pay taxes without searching for a way out, respect human rights, accept legally binding frameworks,

respect nature and operate on the same principles when working outside of the EU. Industries and trade should be a mean to fulfil needs in a sustainable way and the 2030 Agenda is a helpful framework to embrace as corporation. There is a greater need for social innovation disruptive business models like sharing economy and there is more room for SMEs and cooperative models. After listening to the citizens, we need a federation of businesses that are more progressive and push for the change.

THE FUTURE OF ENTREPRENEURSHIP

Guillaume Capelle, social entrepreneur, co-founder and director of SINGA

Intelligence is the ability to adapt to change – conflicts around the globe and climate change often result in migration which creates important changes in societies. What better time to challenge the intelligence of our best industries? Unexpected situations trigger novelty & new perspectives. SINGA is designing better future for solving the most extreme case of uncertainty.

The future of entrepreneurship is about finding concrete solutions to problems. When the biggest problem is our current way of production and distribution, entrepreneurs will focus on social reputation and environmental impact. They will also share their products and learnings. The EU seems like the perfect place to start a responsible economy.

CLEAN ENERGY INDUSTRIAL FORUM

Opening by Vice-President Maroš Šefčovič¹⁸

This first edition of the Clean Energy Industrial Forum will enable us to discuss matters on how to modernise and energise our economy that include innovators, workers, cities, and investors to deliver jobs, growth and investments for Europe. Its themes also concern seizing the impressive growth opportunities created outside Europe for clean energy solutions.

Our climate and energy targets as well as our regulations and financing instruments are already being transformed into investments, innovation, growth and jobs, and some 9 million Europeans are already working in the clean energy sectors. This number is expected to double by 2030.

It can be said that our greatest competitive assets are the values that we uphold ourselves and that the only way to build and consolidate EU industry's position as frontrunner in the global clean energy transition is to defend these core values.



¹⁸ Excerpts from Maroš Šefčovič's speech. Full speech is available: http://europa.eu/rapid/press-release_SPEECH-18-1102_en.htm

In order to stay or become the global leader in innovation, decarbonisation and digitisation we must promote a rule-based multilateral system to fight protectionism, forcefully pursue our sustainability agenda by making sure that our competitiveness and social models work hand in hand and support and empower our citizens, cities, communities and ecosystem to develop new business models with smarter ways of living, consuming and working.

What is needed is industrial ownership and leadership in the Energy Union project. It is already known that energy transition and the global fight against climate change will not succeed without industry and that people are the key drivers of EU innovation and global competitiveness. Competition in the global market place is fierce. China has become the largest clean energy investor in the world. Asian countries are striving to become or stay first-movers, namely Koreans in batteries for instance. We can still overtake them but we need to act fast. Establishing Europe's strong industrial and manufacturing base in strategic sectors should be a priority as it is the only way to bridge the deployment gap. We should also strategically invest into disruptive innovation to achieve our climate goals.

These goals can be achieved primarily through robust partnerships, announcing concrete actions and creating public-private partnerships. Three industry-led initiatives actions have already been or are in the process of being agreed, and will be instrumental to deliver on our energy and climate goals in the future.

Furthermore, batteries are a key enabler for our mobility and energy systems. This sector also has jobs, growth and investment potential and a surge in battery demand is expected over the next 5 years. This represents a new market of around 250 billion euros a year. Europe's renewables industry-led initiative covers all renewable energy technologies and the full sectoral supply chain, passing through project developers. The work is also intensifying on construction. Buildings consume 40% of the EU's final energy demand, which is more than any other sector and the Smart Finance for Smart Building has just been set up by the EIB. This initiative could take up to 3 million families out of energy poverty.

As part of the clean energy forum a number of workshops will feed into our reflections, covering the link between digital and circular economy, the clean mobility sectors and low carbon industrial innovation in energy intensive sectors

By May 2018 during the next 'Mission Innovation' and 'Clean Energy Ministerial' meetings, the world should know what European industry, policy makers, researchers, innovators, cities and investors are collectively delivering to make a success of the new industrial initiative.

A. BATTERIES

Diego Pavia, CEO INNOENERGY

Only if we act now with a systemic approach, a backward and forward integration of the value chain; and a multidimensional coverage including skills, regulation, societal appropriation, technology and innovation supply and value chain, 250 billion euros worth of annual new business is expected to be reached by 2025. 250 billion euros represents between 4 to 5 million new jobs, excluding export.

In 5 months the ecosystem of key players in industry, institutions, financiers and innovators, have come together to start acting as one. The business culture created is of a "can do" attitude, is impact oriented and is urgent. More than 50 actions to reach the objective of harvesting 250 billion euros for Europe have been identified and will be finalized early March.

These actions, covering demand side and supply side measures, are to be implemented by the industry, some together with the Member States and the European Commission who will act as enablers. All these actions need to fulfil one core criteria: to increase the competitiveness of the European Industry, in the European Market and abroad.

Peter Carlsson, CEO NORTHVOLT

It is essential that Europe quickens the pace in terms of permitting and financing projects. We cannot lose track of sustainability and so we should promote recycling initiatives and production with minimal CO2 emissions. The support from the EU and the EIB is crucial for the establishment of a European value chain, and Northvolt is extremely thankful for the support that we have received so far.

Ghislain Lescuyer, CEO SAFT

Together with Solvay, Siemens, Manz and other European partners, Saft is planning to develop and industrialise the battery of the future based on a disruptive solid-state technology. Over the next 5 years, the program will cover research, development and industrialisation for advanced high-density lithium-ion (Li-ion) and Solid-State new generations. It will also deliver a state-of-the-art 4.0 industrial line of 1GWh, which will be ready for scale-up. Furthermore, the batteries will meet the most stringent standards for sustainable development, including those on recycling. The overall benefits of this new technology will include: Intrinsic safety due to solid electrolyte, more energy density such as providing users with double the mileage for the same size battery, and lower costs per kWh.

In addition, a favourable environment built on four priority elements must be put in place in order for us to bring timely and precise solutions to market. These elements include: fairer competition in Europe than in Asia and the US, providing the right environment standards such as battery carbon content or labour standards, quicker access to funding for industrial partners and a skilled and trained workforce for a competitive battery industry.

Holger Gritzka, CEO TERRAE

There are two major elements required for the future success of European Industry. These are: providing public funding to support CAPEX in overcoming the instability of the capital market and ensuring more timely reactions from banks and authorities. There should also be no subsidies for battery cells or final products with battery cells in order to avoid the solar market effect. This should attract the attention of Asian cell manufacturers much faster.

Andrew McDowell, Vice President of European Investment Bank

The EIB is ready to support the increased pace of investments in the sector across the full value chain, as indicated by the approval of a demonstration project on Li-Ion battery cells manufacturing in February 2018 called the Northvolt Commercial Demonstration Line. In parallel, the EIB has engaged in preliminary talks on a number of potential promising operations and apart from investments for battery applications in transport projects, EIB also supports battery projects for energy storage.

Furthermore, the EIB has dedicated financial instruments such as the Energy Demonstration Projects (EDP) mandate through the InnovFin Financial Instruments with the European Commission, that are aimed at financing demonstration projects of new technologies, including for batteries. EIB financing would be dependent upon a sound project rationale, an experienced promoter and a realistic perspective for commercialisation and it would be limited to 50% of the project cost.

B. RENEWABLES

Giles Dickson, CEO Wind Europe

Factories supporting the European wind industry are located in every EU member state and provide employment to 260000 people. They also provide EUR 36 billion to the economy and EUR 8 billion in exports. Furthermore, local wind farms are supporting local communities through taxes.

The European wind industry however is increasingly importing components from overseas to remain competitive. The share of EU components in wind turbines has fallen from 100% to 50%, and may reduce even further in the next couple of years to 25%. In total, export has fallen by 30%.

In order to sustain industrial competitiveness of the wind industry in the EU, then a higher renewable energy target of 35% by 2030 is a must. Research and development is also needed for breakthrough technologies, market commercialisation, and innovation in mature technologies. In addition, low cost finance and support in export finance is also needed to enable us to compete internationally.

José Ignacio Sanchez Galán, CEO Iberdrola

In 2001, Iberdrola made a deliberate choice to shift towards green energy. In the next phase, the electrification of the energy sector will be an important development to make the energy transition happen.

Europe is currently leading the green energy transition and has all the necessary components, such as industry, policy makers and consumers, engaged to continue its success. However, there is still more work to be done in order to accelerate the transition. To do this, we suggest introducing carbon pricing, placing more emphasis on the management of the grids and homogenising taxation on electricity prices.

Florence Lambert, CEO/CEA Liten

Synchronisation between research and industry is crucial, and it needs to be sped up in order to compete with other countries. Clean energy research in Europe should also be concentrated and coordinated through innovative hubs, such as big pilot lines and demonstration projects.

Such pilot lines and projects would have to cover the full value chain, allow all innovative actors to work together and reduce the risk for investors.

Furthermore, industrial competitiveness requires a systemic approach that focusses on electricity, heating and cooling and transport simultaneously, whilst including all forms of energy storage such as batteries, hydrogen and synthetic fuels. Digitalisation, modelling and data analysis are also highly important elements to ensure competitiveness.

Lastly, a European approach is key. European markets are necessary for the uptake of new technologies to ensure competitiveness as well as a European industry that is ready to commit to taking on new research and various innovations derived by European researchers.

Dominique Ristori, Director-General for Energy, European Commission

The EU has a long history as a global leader in renewables, starting as early as 2009 by setting the 20% target in 2020. The EU must now take advantage of its leadership, as the costs of renewables are decreasing significantly, and are expected to continue to decrease.

Europe has technological leadership in some parts of the value chain of renewable energy, but not everywhere. The EU is now in the process of putting in place the most advanced regulatory framework to facilitate the rapid penetration of renewables in all sectors.

Zhecho Stankov, Deputy Minister of Energy (Bulgaria)

We promote an open and transparent process and we also fully support the Clean Energy Industrial Forum as we believe that it will unlock potential in the renewable energy sector.

Claude Turmes, Member of the European Parliament

We recently launched a new paper¹⁹ on the ‘Five Action Points’ to get the European Union back on track as a global green technology leader.

Firstly, European society needs a vision. We envisage a net zero carbon economy by 2050. Secondly, the EU requires a significant home market to be a global leader, requiring at least 35% renewables by 2030. The EU should also provide funding for research and innovation and it should allocate an increased budget to energy efficiency, clean technologies and initiatives to create 100% renewables systems. In addition, the EU should provide an increased EU budget for energy transitions related spending, including support for initiatives that support citizens, cities and rural areas. Lastly, new trade, procurement and foreign investment policies should introduce strong criteria to support green technologies.²⁰

James Watson, CEO SolarPower Europe

The EU is still leading in segments of the value chain of the solar PV industry, with many of the global leaders in raw materials, modules, building integration, invertors, balance of systems, developers, storage, utilities, operations and maintenance, financial sector, digitalisation located in Europe. The EU should retain leadership in key value chain segments, including raw materials, storage deployment, inverters and solar services, as the European solar PV industry could result in 335000 additional jobs and 18 billion gross added value with a 35% renewables target. 75% of these jobs would be in the downstream sector. This would include engineering, installation, operation and management, and decommissioning.

¹⁹ <http://energyblog.claudeturmes.lu/industry/five-action-points-to-get-the-european-union-back-on-track-as-a-global-green-technology-leader/>

²⁰ The link to the paper can be found here: <http://energyblog.claudeturmes.lu/industry/five-action-points-to-get-the-european-union-back-on-track-as-a-global-green-technology-leader/>

We believe that a strong EU industry requires enhanced sector coupling, creating multiplier effect for jobs, which will increase the value contribution of the solar value chain in Europe.

C. CONSTRUCTION

Antoine Aslanides, Co-Chair of the ECTP Energy Efficient Buildings Partnership Board

By conceiving and implementing solutions at a higher geographical scale, such as eco-districts, we have created huge potential for developing synergies and optimisation, whilst ensuring social cohesion development at the same time. Cities should therefore continue to create more favourable conditions for creativity and innovation.

Luca Bertalot, Secretary General of the European Mortgage Federation - European Covered Bond Council

We believe that improved financing conditions can help to revolutionise industry and concrete evidence is being developed that links energy performance to financial performance. Moreover, as renovation is less risky than starting brand new constructions, mortgages should be cheaper for EU citizens.

Niels Kåre Bruun, CEO Better Home

The pay-back time for energy renovations alone is not always compelling enough. Increased inner comfort and protection of the underlying assets are arguably the most important aspects of accelerating renovation levels.

Digital platforms can also help to overcome the fragmentation of the full value chain. Cooperation between contractors and installers, construction product industry, utilities, financial institutions and users are key, and digitalisation has therefore proven itself to open many new windows of opportunity.

Paul Vermeylen, President/CEO CityConsult sprl

Renovation is a complex affair that requires cooperation between many actors. Regulation however is a local affair, as regulations differ between Member States, regions and cities, and this limits the scope for upscaling. Renovating a building is not only a costly exercise but also a stressful life event, which makes people think twice before they act.

Owners and building occupiers need to be put at the heart of the debate, as there is the potential for finding solutions that will make the process much more manageable for them.

Renovation provides a huge opportunity to contribute not only to energy efficiency but also to the circular economy. Nowadays, renovation has become the dominant activity through the 'build and demolish' paradigm. This is a unique European future however more can be done to make use of the repository of recyclable materials.

D. CROSS-CUTTING CHALLENGES

Charlina Vitcheva, Deputy Director-General, Joint Research Centre, European Commission

Industry's readiness to deliver on the Paris agreement, capitalise on the growing global clean energy market and expand European value chains by translating them into growth and jobs, is an opportunity. This does not come without significant challenges however, as industry around the world will compete for a share of this growing market. For example, EU manufacturers capture just 13% of the global cathode materials market and an insignificant share of anode materials used in batteries. 3 million construction workers need to expand their skills to energy efficiency and renewable energy source; a common EU framework, such as standards, compatible data models and interoperability is necessary to promote digitalisation. If Europe maintains its share in the global wind energy market, export volumes would increase four-fold, and an additional 290 000 jobs would be created by 2030.

Dedicated actions at European, national and local level as well as by industry are needed to foster the success of European clean energy industry, particularly on materials value chains, education and skills, research and innovation, digitalisation, social innovation and global trade. Global leadership also requires a significant increase in public and private research as well as innovation investments. The EU is the second largest public investor of clean energy technologies in R&I, with Member States investing annually about €4.5 billion and European industry investing an additional €16 billion. Furthermore, Horizon 2020 dedicates over €10 billion to clean energy funding in 2014-2020.

Stronger cooperation within Europe, through the implementation of the SET-Plan, and on a global level as part of Mission Innovation and the Clean Energy Ministerial Initiatives, is the way forward for Europe in becoming a global leader in clean energy technologies.

Åsa Karlsson Björkmarker, Vice-Mayor of Växjö, Member of the Board of the European Covenant of Mayors

Björkmarker highlighted key messages on expectations from Mayors to the Energy Industry Community, following the meeting of the Board of the European Covenant of Mayors which took place the day before.

Prof Jean-Michel Glachant, Director of the Florence School of Regulation and Director of Loyola de Palacio Energy Policy Programme, European University Institute

Glachant complemented and enriched debates by bringing in an academic perspective on Clean Energy policy developments.

Closing remarks by Vice-President Maroš Šefčovič²¹

Our objective for the Batteries Alliance is simple. We want to create a competitive and sustainable, battery cell manufacturing in Europe supported by a full EU-based value chain.

²¹ Excerpts from Maroš Šefčovič's speech. Full speech is available: http://europa.eu/rapid/press-release_SPEECH-18-1168_en.htm

We know that we have what it takes to become world leaders due to our strong research and innovation, leading companies throughout the value chain, strong recycling competence, a highly-skilled workforce, an attractive ecosystem, as well as political, regulatory, and financial support. However, we do not yet have a scaled up manufacturing capacity in battery cells.



By 2025, the European battery market could be worth around €250 billion per year, which is as large as the entire Danish economy. In order to take full control of this market, we will need between ten and twenty Giga factories in Europe and it has been estimated that the size of the investment required would be around €1 billion per 10 GWh. This means that we would need around 20 billion euros of investment. Whilst this would be a huge investment for Europe, it is well within our reach. Furthermore the scale and speed

needed means that combined efforts are required and they should be industry-led.

Since October 2017, the Batteries Alliance has helped to generate considerable traction with concrete projects and actions emerging. EU industry has done the necessary research to show that there is a willingness to make the investment and take the risks. The European Investment Bank is also one of our strategic partners and InnoEnergy has proposed 20 priority actions to establish a full competitive value chain in Europe. Following the work of industry and Commission services that is happening at present, there are many extremely interesting actions that we need to pursue. This includes the simplification of approval procedures and permitting processes in the EU, imaginative ways of reducing the carbon footprint of battery manufacturing and financing demo projects.

We have reached out to interested Member States and we are now looking into practical ways forward to create the right conditions for industry investment. To make it a success, a joint and concerted effort is of the utmost importance.

CLUSTERS AND PARTNERSHIPS FOR STRONGER EU VALUE CHAINS

Marc Lemaître, Director General, DG REGIO

"If we want to make Europe's industry more competitive we need to make better use of clusters: strengthen their interregional, cross-sectoral and interdisciplinary collaboration in common domains of specialisation."

This was one of the key messages of the 'GROW your REGION' conference that we organised three months ago in Valencia. The 300 participants called for dedicated support for more strategic partnering through clusters and highlighted that the right actors need to be involved: policy-makers, SME intermediaries - such as clusters - and industry.

The recent Communication of the Commission on "Strengthening Innovation in Europe's Regions" adopted last July highlighted ways to maximise Europe's industrial potential through national and regional smart specialisation strategies. And the "New Industrial Policy Strategy for Europe" adopted last September, stresses the need to maintain the European position as the global leader in many industries, especially in high value added, low carbon and sophisticated products and services. Major

efforts are needed to adjust to the challenges and reap the vast opportunities of the new industrial age.

First of all, we need to strengthen our industry's ability to continuously adapt and innovate with the use of new technologies. Secondly, Europe needs to increase its interregional cooperation in order to reinforce and reshape our value-chains and connecting strengths of our regions and their stakeholders in different EU countries. Finally, we need to continue our efforts in fostering our innovation ecosystems where SMEs and start-ups can connect with potential partners and investors.

Gabriela Pirvu, Senior counsellor and coordinator of Romanian cluster policy at Ministry of Economy

Romania is in full process of elaboration of its industrial policy document based on the regional smart specialization strategies and on the Romanian Competitiveness Strategy 2014-2020. We consider all objectives of the renewed EU industrial policy strategy to be very important but it's needed a prioritization of them taking into account the available resources, Romania and the 8 development regions must move up the value chain and exploit their comparative advantages. Innovation gap is evident between the Romanian regions and clusters. To support industrial innovation by channelling RDI funding through excellent clusters on a long term is crucial to enter global value chains. Romanian funding programs help both cluster management to reach excellence and businesses to innovate continuously. Only by creating products and services that meet consumers' evolving demands can they thrive on global markets and create prosperity and jobs. This requires a vision for the future to modernize Romanian industry by embracing digitization, technological and social innovation, eco-innovation and circular economy. Even if Romanian economy becomes increasingly services based, industry remains an important pillar. For Romania to remain competitive it will be necessary to fill missing links in the relevant value chains. This is why investment in industry is of strategic importance. Openness to foreign investment remains a major source of growth. Large firms mainly multinationals within the Romanian clusters (automotive, building materials, agro-food etc.) play a catalyst role because they create a critical mass of experienced managers, they provide ideal conditions for high technology firms to develop and have they have multiplier effects in terms of a region's local economy for materials and resources.

The new Romanian cluster policy will rethink its approach by supporting the transformation of existing industrial value chains or the emerging of new ones for the development of cross-sectorial emerging industries and secondly to support the development of world class clusters. Today, Romania has 70 clusters benchmarked by CLUSTERO-Romanian Clusters Association, out of which 1 gained gold label, 10 silver labels and 28 bronze labels. Cooperation with EU Member States, regions, cities and clusters remains a preferred approach for Romania to exchange best practices and to facilitate networking for future projects. Start-ups and innovators in Romania should be brought into collaboration with leading players in EU so that they can enter global value chains.

To make better use of clusters as strategic tools of industrial policy, we suggest: adjusting the EU programs to new activities of clusters, making the EU framework conditions for the new programming period "cluster friendly" and more programs for clusters including management training, and the exchange of best practices. Furthermore, supporting international cooperation among clusters, cluster labelling and supporting new value chains by integrating sectors and technologies such as automotive-ITC-creative industries and interconnecting value added chains to value added networks are also necessities.

Emily Wise, Researcher Fellow, Lund University

Cluster organisations are an effective instrument to address SMEs' internationalisation support needs. They know the businesses, scout for relevant opportunities, and proactively provide a tailored service offering that is embedded within a broader strategic context. Cluster organisations act as magnets and mobilisers of SMEs' exposure and integration into international value chains, helping them take the first steps to build new knowledge, inspiration and broader networks (in the short term), which contribute to new international research and innovation or commercial collaboration (in the longer-term).

To strengthen the role that cluster organisations play in facilitating the integration of SMEs into EU and global value chains and similar intermediaries, such as digital innovation hubs and public-private partnerships, policymakers need to recognise and acknowledge their role and support the continued professionalization of cluster managers. This may include actions such as defining cluster organisations and other innovation intermediaries as a particular category of funding recipient in innovation programmes, with funding levels reflecting the nature of their role and non-profit status. It might also involve developing more programmes that specifically leverage the role of innovation intermediaries and adopting more easily accessible and flexible funding instruments. This also includes continued development and experience exchange on aspects such as business and service models, funds for 'experimental development and collaboration' across sectors and regions driven by regional authorities within RIS3.

Kai Lamottke, co-founder & Managing Director of Bicoll GmbH

Enabling and supporting service functions to implement individual ideas of coping with the future is essential. Europe needs a strong and innovative industry as a source of quality jobs and an engine of competitiveness, innovation and sustainability. Programmes for SMEs that focus on cost effectiveness are also needed.

Reimbursement schemes for the top applications as well as grant allocation for certain projects should be introduced. SME use their resources, especially for future products, much more efficiently than larger organisations, but they are lacking free resources leveraging optimal access to the application process of EU-wide funding and support opportunities. Large organisations such as the EU as well as big enterprises have a common understanding of similar processes and available resources to match. SME and EU funded and executed projects have an inherent organisational mismatch of applying and executing programs due to their different sizes as well as agenda setting. The success on the market is not automatically correlated with gaining access to EU programs.

The EU has the intention to facilitate resources based on their decision making process on third parties evaluations of SME behaviours such as surveys, studies, research topics and outcomes. A direct feedback loop of treated SME and cluster organisations should be implemented. The SME advisory board that was implemented in the Cluster organisation is helping them to stay on track, perfectly facilitating SME interest in internationalisation and market access.

Bianca Dragomir, European Cluster Manager of the Year 2016

The European industry imagines a future mastering digitisation and decarbonisation. Achieving a 'well below 2C' Paris Agreement target requires a speed of decarbonisation six times faster than anything Europe has achieved so far, meaning that more impact is needed to accelerate this transformation. Clusters play a crucial role in this context. They are brokers of innovation, impact

multipliers and the ideal tools for regions to accelerate their transition. Clusters are the spark plugs of Europe's industrial modernisation!

At AVAENSEN we managed to create a regional cluster that managed to unlock a market of 1.5 billion euros worth of cleantech business opportunities for SMEs in 12 European regions, scale up 275 start-ups and bridge the internationalisation of more than 100 SMEs to the global market.

Vice-President Katainen referred yesterday to the EU-Japan trade agreement. The first foreign company to build a photovoltaic plant in Japan is actually a European SME, a Valencian SME member of our cluster. This happened as a result of AVAENSEN Cluster participating in the European Cluster Mission to Japan a few years ago. Since then, 6 other Valencian SMEs followed, which proves that European SMEs are gaining access to new value chains even in such high-tech markets as those of the Japanese.

Over the past year, I've had some inspiring discussions with almost a hundred cluster managers regarding the success formula for creating open, innovation-driven clusters for a renewed industry in Europe. And I can now say that we, clusters, are ready to lead the industrial modernization in Europe! To do this at the speed and with the focus Europe needs, several key tools are needed. Firstly, we need to branch out more with cross-sectoral collaboration. One year ago, AVAENSEN launched the Valencian smart cities innovation ecosystem with 127 partners. The first 5 projects are being executed as we speak.

A second essential key is the Interregional collaboration through clusters, which is vital for supporting innovation, industrial modernization and the scaling up of SMEs.

When we marry cross-sectoral and interregional collaboration, new value chains are created. An example is the European Strategic Cluster Partnership: Energy in Water in which AVAENSEN Cluster together with other 7 EU clusters have supported 180 SMEs in the energy-water nexus. We are now taking this success to the next level by linking up with textile and plastics clusters, for whose competitiveness, energy and water efficiency are decisive. In this way, new global value chains are being created, SMEs punch above their weight and clusters do what they're best at, accelerate smart investments to market.

We need more of these. Smart specialisation strategies guide more than 120 billion euros of European Structural and Investment Funds in regions to boost research and innovation. Clusters are the right tools to maximise their impact and unlock interregional collaboration.

The big challenge that remains is to hit every corner of Europe with excellence. As President Juncker mentioned in the opening of last year's European Industry Day, 'Europe needs to breathe with both its Eastern and Western lungs; otherwise it will struggle for air', It is inspiring to see COSME, INTEREG, H2020 and now the EIT acknowledging clusters as key to unlock breakthrough innovation and SME across Europe. The start-up AEROX has developed an innovative coating system for wind power turbine blades that reduces the blade's maintenance cost and increases its efficiency to a 30%. The team is taking their business to the next level now through collaboration with big industrial players like Vestas.

So, to affect rapid change in Europe, we definitely need champions. We also need sound partnerships, like the European Strategic Cluster Partnerships or like the European Battery Alliance, which was launched earlier this week by Commissioner Sefcovic.

We need more dedicated support. We need European bodies and programmes 'clustering' their efforts in support of European clusters, especially post 2020. We need new, agile and cutting edge instruments if we really want to reinvent sectors. We need mission-oriented innovation policies with clusters at the heart, as key drivers of growth.

Europe's industry is constantly seeking its identity, and we need clusters in the driver's seat of the industrial modernization.

TECHNOLOGIES OF THE FUTURE: KEY ENABLING TECHNOLOGIES

The role of industry for the future of Europe, including in retaining strong social dimension of European societies, has been strongly emphasised in the High Level Strategy Group (HLSG) conference document. It highlights complex global economic and social context driven by globalisation, digitisation and the knowledge society.

KETs (Key Enabling Technologies) as defined by the HLSG were presented in the sectors of production technologies, digital technologies and cyber technologies. These were namely: advanced manufacturing technologies, advanced materials and nanotechnologies, life science, micro-nanoelectronics and photonics, artificial intelligence, security and connectivity. The EU KETs policy so far has been an example of successful support for the industry, yet the results of such policy are only starting to be visible now. It is therefore necessary to continue its adaptation, as suggested in the HLSG 'Re-finding' Industry conference document.

Due to the vast number of emerging and strong global competitors and dynamic technological changes, the current global context cannot continue at its usual pace. If Europe is to remain globally competitive, cooperation between national governments and the private sector is crucial and public financial support is essential for long term Research and Development investments. More agile regulation in less fragmented markets together with other framework conditions and appropriate taxation is also highly desirable.

Markus Borchert, Senior Vice President of Market Europe, Nokia

The three new KETs, Connectivity, Cybersecurity, and Artificial Intelligence among others should be at the centre of a European industrial policy, R&D funding and skills development. The need for driving the 5G investments, innovation and early deployment should be highlighted, and are essential components for all industry sectors on the path towards the fourth Industrial Revolution.

Security is also a key requirement in a digital society, meaning that cybersecurity technologies will be an indispensable necessity. Critical infrastructure depends on cybersecurity, whilst citizens' and government trust requires it. For businesses, high-level cybersecurity will be an enabler for the successful digitization of all industry sectors and society overall.

Furthermore, artificial intelligence is ground-breaking and we have to therefore lead the way on the usage of such technology to enable us to fully benefit from its potential, and use it for the advancement of growth and society.

Dr Daan Schuurbiers, De Proeffabriek

Governmental support for industrial technologies should not just be focused on growth and competitiveness, but also on social value creation: realising social and environmental benefits in addition to economic gain.

Putting social value creation at the heart of industrial innovation governance would focus industrial technologies more directly towards the welfare and wellbeing of European citizens. This requires opening up industrial innovation policy, decision-making and assessment to allow input from a broader community of stakeholders beyond industry, academia and government.

Industrial technologies can help us address the grand societal challenges we are facing today, for instance by enabling more efficient use of natural resources, reducing the environmental impacts of human activity, enabling clean and affordable energy and by fighting disease and promoting health and wellbeing. In order to unlock their full potential however, we must start targeting these challenges much more directly. This requires a Copernican Turn. Copernicus reordered an entire worldview by arguing that the earth revolves around the sun, instead of the other way around. Innovation governance is facing a similar challenge, that the order of innovation has to be reversed, turning social and environmental considerations into the driver for research and innovation, rather than a fortunate by-product.

Astrid Simonsen Joos, CEO Philips Lighting Nordic

All KETs must have the citizens at the forefront of their creation in order to improve peoples' lives. Firstly, they must accelerate in connectivity. For example, by 2020 streetlamps will be the primary network infrastructure for 80% of smart cities. Secondly, agile regulation for new business models is necessary as regulation must keep up with our new reality and new technologies create a need for new skills and education. Thirdly, data must be considered as a driver for growth. It must also provide and display more public data as well create clearer guidelines in order to increase companies' data usage.

Giulia Gregori, Head of NOVAMONT's Strategic planning and institutional communication

Key Enabling Technologies should be focused on supporting the development of Europe's leadership in a low-carbon and circular economy, thus contributing to face the main challenges of our time: climate change, food security, availability of energy and raw materials, waste management, pollution, biodiversity loss and soil degradation, among several others. Finding a solution to these global challenges means changing the economic, as well as cultural, paradigm by supporting the development of those sectors where products are designed to be a solution for environmental and social issues. This would create virtuous and circular systems, limit waste accumulation and reduce greenhouse gas emissions.

Europe has already developed technologies that are able to support this change of paradigm and guide the transition towards a more sustainable development model, particularly in the circular bioeconomy sector. It must now capitalise on this leadership and tackle increasing global competition in green production and clean energy technologies, since a stronger development of the circular bioeconomy can also help the EU to generate new growth and new jobs.

While research and innovation are the main engines of the industrial development, the scale-up of economically and environmentally sustainable processes is the key challenge of our time. Private-public collaborations in term of research, innovation and technologies development are crucial; the private sector should provide skills, expertise and assume the market risk, while the public sector should provide legislation, funding, university skills and promote the diffusion of private-public partnerships.

Additive manufacturing benefits today from the fast development in material sciences and software solutions, such as for optimized modelling of multifunctional products, and we have therefore overcome the former scepticism that additive approaches including 3D printing will never be part of mass production. More than ever, IT security and IP protection are hot topics but have to become easily manageable, in particular for start-ups, with the potential to become global players.

Andrea E. Reinhardt, Co-Chair of NANO futures

Europe takes care of consumer protection, which is one of our strengths. Instead of more regional regulation approaches, it is needed to keep the European focus and gain a high acceptance level from consumers as well companies.

The programs inspiring young scientists to travel and develop skills are essential for coherence in Europe. We are expecting university graduates to launch their own start-ups, particularly in countries with high youth unemployment. Such start-ups will only be successful however if they can use the diversity of cultural backgrounds as a basis for inspiration.

Furthermore, we need to overcome fragmentation in education and training. Based on the high level of education systems in Europe, we need future flexible systems and make them more efficient with existing bottom-up approaches that offer learning for everybody. This will support lifelong learning and improved skill development in every phase of peoples' careers and it will increase the acceptance of technologies in society.

Dr Karen Amram, CEATECH - CEA Direction de la Recherche Technologique, Director for Europe

The six current KETs have been driving the emerging industrial technologies. In terms of industrial modernisation, KETs have proven to be both a catalyst and a driver and have been generic enough to underpin innovation across all different markets and sectors. The most quoted ones being quantum technology, autonomous driving, Cyber-Physical Systems and carbon neutral society, all rely strongly on KETs. It would be therefore be undesirable to shift the attention away from KETs and risk losing momentum in areas where Europe is just beginning to see the payback from their actions. To stay on course and guarantee both sovereignty and security, Europe must continue to remain strong in KETs, maintaining the current list while adapting it to new challenges, and boost their deployment through reinforced dedicated programmes.

Furthermore, Research Technology Organisations (RTOs) have to be clearly identified as KETs Integrators, highly contributing to the three global transitions Europe has to manage: ecological, medical and digital. For example, innovations in electric vehicles, combining microelectronics, photonics, advanced manufacturing and materials with digital technologies and integrating them into complex systems are the kind of cross products that only RTOs can manage to achieve for the benefit of industry, bridging the gap between science and industry. The decisions to take in the framework of the European industrial strategy need to allow a favourable environment for RTOs in Europe.

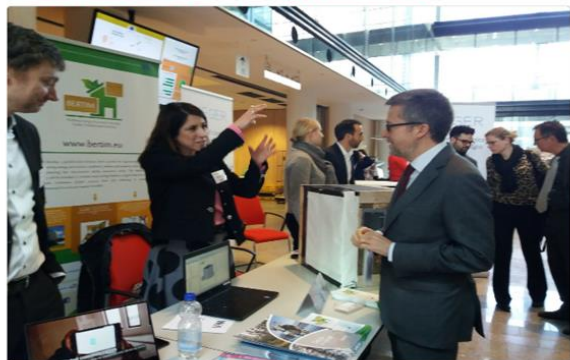
Industrial technologies are also synonymous of growth, competitiveness and jobs. They have so far played an immense role in creating added value, addressing societal challenges and tackling any kind of security issues, and it is therefore crucial to support open, shared and efficient industrial and demonstration infrastructures. Without them, Europe will not be able to reach its huge potential in re-industrialisation.

SUSTAINABLE INDUSTRY

Investments in traditional Key Enabling technologies (KETs) are important, as are investments in the newer KETs, such as digitalisation and artificial intelligence in order to seize major opportunities in



Very happy to see Commissioner @Moedas visiting our #H2020 @ProjectBertim developing innovative ways to renovate Europe's #buildings on an industrial scale: europa.eu/!yM77Mh #EUIndustryDay #energyefficiency



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greening our industry and decrease GHG emissions. However, more emphasis on the scaling up of technologies that can lead to significant GHG emissions is and stability in regulatory framework is needed. Funding and funding instruments are also critical to de-risk technologies which might take several years to be developed. Funding shouldn't be evenly spread across all topics, but rather targeted towards the domains which can deliver on the major global challenges and ambitious policy objectives. It is therefore highly important that FP9 focusses on these global challenges and that its agenda is prioritised accordingly. Furthermore, the process industry is a critically important sector for the European economy. But as they represent 20% of global GHG emissions, they also have a high environmental impact.

There are however existing programmes in The Research Fund for Coal & Steel (RFCS) and the Public-Private Partnership SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) that address research and innovation in energy intensive industries. It will therefore be important for the EU to continue to support these sectors in FP9 by, for example, including steel in the future R&I activities and encourage the industry to develop competitive low carbon technology options. This could be achieved through a public-private partnership with the EU steel industry.

It should be reinstated that collaborative research is and will remain at the heart of the EU R&I efforts. Along with a transition to greener industries, we also need to prepare linked social transition for the workforce, new jobs which come with novel green technologies, as it is critical to ensure the sustainability of our industry, society and economy.

Moreover, Europe is responsible for only around 10% of global emissions, but it can still make a big difference at global level by exporting and supporting the adoption of its high environmental standards. It is thus critical to leverage the full potential of the European market, which is the biggest in the world, on a global level.

Lastly, we need a life cycle thinking approach in order to find smart ways to efficiently and effectively use our resources (including waste) in the best possible way. This will be absolutely necessary to build a circular economy in Europe and on a global level.

Hermann Bach, Covestro

Research and Investment (R&I) is a basis for competitiveness for European industry and their future architecture should therefore stimulate funding, reduce risks and speed up the time to the market of innovation. Funding levels need to be high enough to ensure that the EU does not lag behind other regions, and they need to be accessible throughout the entire innovation ecosystem. A continued

focus is needed on Key Enabling Technologies in the fields of advanced materials, advanced process technologies, industrial biotechnology and CO₂ valorisation, as these are essential to address societal challenges and will be the enabler for the future of Europe and European industry.

The impact as an output variable is key to measuring the success of such R&I programmes and in most cases, sustainable impact derives not just from one isolated project only. The key to success is a coherent series of well interlinked projects that forms a programme working in consecutive TRL levels to a defined target. This will deliver a sustainable impact.

Another aspect for achieving a sustainable industry is the policy framework. It needs to take a broad view, with the ultimate aim of an overall reduction of resources used. Looking at the full lifecycle of products is crucial, and reimagining our relationship with carbon can help. By looking at the way we invest carbon and the return on carbon employed, we can encourage positive uses of it.

Daniel Gauthier, President of SPIRE

We will not be able to obtain a sustainable EU industry if the process industry is not the main contributor. Process industries deliver a great impact on society as every product we use as citizens will contain a footprint in CO₂, in natural resources, in water and in energy that will depend on the performance of the Process Industry. We are also the enablers of the low carbon economy and society, as windmills, high-speed trains, road infrastructure, energy-efficient cities have all been supplied by Process Industries.

Process industries have the largest industrial sites in the EU and therefore every environmental improvement that we make to our sites benefits the whole EU society.

On an environmental level since 2008, the total EU industry GHG emissions have decreased by 16% as opposed to SPIRE GHG intensity, which fell by 26%. From 1991 to 2016, SPIRE energy intensity decreased by 46% whilst production increased by 45%. In the same period, SPIRE energy consumption fell by 22%

On an economic level, process industry can be arguably seen as the backbone of EU economy and Europe needs to therefore keep the value chain at home if we want to continue to create jobs in the EU. Statistically, in 2015 it turned over 1,8 trillion euros, which stands for more than 56% of industrial value added in the EU and around 10% of all economic activity. Furthermore, more than 6,3 million direct jobs in the EU as well as a further 19 million indirect jobs were created as a result. SPIRE sectors account for 46% of total industrial employment and 7% of total employment in Europe. It also accounts for 565 billion euros of added value in EU economy, which is almost 4.7% of EU28 GDP.

Process Industry needs the support of Horizon 2020 and FP9 because the environmental challenges have grown exponentially. Meanwhile, it is crucial to restore EU global competitiveness remains as the market shares of the process industries in relation to China or the USA continues declining.

The future is made in Europe specifically for its citizens and it will no longer focus separately on individual sectors and locations. SPIRE sectors should take advantage of cross-sectorial collaboration to create joint understanding, more coordination and synergies. SPIRE is a pioneering model that can be taken as a reference and SPIRE Vision 2040 is being shaped. We want to achieve a fully sustainable, agile, flexible and competitive process industry. Research and Innovation is therefore fundamental to achieving our objectives and Industrial Symbiosis and digitalisation are key enablers to making it a reality. We want to pioneer the industrial management and use of energy, resources, waste and water and we therefore believe that SPIRE is a fundamental component of FP9 in its contribution to EU society.

Barbara Kux, External Director at Firmenich, Engie, Henkel, Parges

Environmental technologies and businesses offer substantial opportunities for European companies and for Europe and the global market is planned to double to over 5 Billion Euro by 2025. This includes energy efficiency, sustainable water, sustainable power, raw material efficiency and sustainable transport and we can currently see that European industry is in a leading position.

However, the green race between countries and companies is on and increasing. China made with over 80 Billion USD of investments in renewable energy in 2015, whilst 62% of the top 100 cleantech companies are originating from the US. New entrants like Tesla and Google are also building up positions in the green business segments.

Furthermore, key technologies for CO₂ reduction in Europe already exist and the largest opportunity lies in energy efficiency. Speeding up the implementation of existing technologies combined with a more stable and higher CO₂ price could substantially contribute to the decarbonisation of Europe and the achievement of the Paris challenge.

The role of the EU is important in areas specifically relating to R & I as it can provide support for basic research and capital-intensive developments in sectors of strategic importance for Europe, take on risks of first-of-its kind projects and support the development of a European cleantech ecosystem and topic specific “Cleantech Silicon Valleys”. It is also in a good position to set up a Clean Tech Venture Capital Fund for decarbonisation technologies accessible for all companies including start-ups.

Rosa Garcia Piñeiro, Alcoa Sustainability Vice-president

Competitiveness is the key priority for the Aluminium industry as it is a global sector governed by competitiveness. Developing an EU industrial policy which enables a level playing field securing competitiveness of Europe compared to other region is therefore essential. This would require a holistic approach encompassing innovation, climate change, trade, energy, and the circular economy. Such positive level playing field is a pre-requisite for securing long-term investment for production and research activities in Europe all along an integrated aluminium value chain.

FP9 and other public funds for research and innovation should serve the EU industrial policy by prioritising objectives and targets as the aluminium industry considers decarbonisation and circular economy as two major priorities for the next decades. The European primary aluminium industry is already one of the best in class being about 3 times less carbon-intensive than the global average but there is still a need for further improvement. Moving to a very low-carbon intensity disruptive innovation is needed and it will require large investments and the involvement of other sectors, such as the energy sector. This is where EU funds can make a difference. The same can be said for the circular economy, which is already a reality in Europe. Today, more than 50% of the aluminium supply in Europe comes from recycling, making Europe the champion globally. To boost such circularity even further, significant investments are still needed in efficient sorting, cleaning and purification technologies and infrastructures.

Considering the sustainability challenges that lie ahead of us, collaborative platform like SPIRE, where various sectors cooperate, is essential as it is a place where the Industrial cross-sectoral symbiosis is initiated. Hence, the aluminium sector is supportive to develop further such kind of cross-sectoral collaborative platform acting as a catalyst to move to a more sustainable Europe. As an example, the Aluminium industry will soon start an important EU funded collaborative project called RemovAL, initiated under the Horizon 2020 framework. RemovAL aims to turn bauxite residue and other waste streams, e.g. Spent Pot Linings (SPL), into resources through industrial symbiosis. The sectors of

cement, construction and insulating materials are engaged in addition to the aluminum sector and it is a 4-years project involving 27 partners with an overall EC funding of about 11.5 M€.

Carl De Maré, Chairman of ESTEP (European Steel Technology Platform), Head of Technology Strategy of ArcelorMittal

The future of the European industry is highly dependent on its ambition to turn the challenges of becoming truly sustainable into opportunities. European manufacturing industry need to focus on Circularity. The circular economy package should become much more ambitious and need to be the transformation force as the Renewable energy directive was for the energy sector.

This is already the objective of the steel sector and it is ready today to launch a large Scale initiative which focuses on circularity and low carbon steelmaking. The scale of the sector is an opportunity for the other sectors. For example, CCU from the steel sector is a large enough chemical feedstock for the chemical sector or, equally, the steel sector can become the major player in recycling waste plastics.

The large scale, the high efficiency of the European industry today and the need for cross-sectorial collaboration makes that the valley of death for these innovations is larger than ever. Only for the piloting of the pathways for low carbon steel technologies a budget of 1,5 b EUR is required and 10b EUR for the large scale demonstration and setting up a broad PPP to work intensively together is the only way to deal with those financial risks. In order to make the initiative a success, the role of the public is essential, not only to help with the funding, but also in creating the new legislative framework which is required for new sustainable products and to create new circular business models.

ARTIFICIAL INTELLIGENCE FOR INDUSTRIAL TRANSFORMATION

AI is a game changer technology with far-reaching consequences for citizens and businesses. It is already offering innovative solutions for the well-being of European citizens, as seen in the healthcare sector, transport and environment management. It is also shifting industrial value chains, transforming production and opening massive business opportunities.

Industry sectors currently leading in AI deployment are automotive, healthcare, financial services, telecommunications, manufacturing, energy, travel and transportation, and logistics, areas where Europe is leading. It is there of utmost importance that these industries do not lose their competitive advantage by under-investing in AI and fostering broad and speedy AI adoption by SMEs is a priority. Europe can win the global AI race if it succeeds to valorise Europe's strong industrial leadership, scientific excellence and innovative start-up ecosystems.

In addition, Europe must also lead in the AI business-to-business market and the development of the intelligent enterprise. The objective of the forthcoming European AI strategy should therefore be to make Europe the Global Hub for industrial AI applications that ensures a level playing field and open AI markets for the European AI industry. Furthermore, AI will have an impact on the labour market, with new jobs being created and many jobs eliminated and transformed. Europe will require a specialised talent pool and should encourage the free and dynamic movement of talents, also from outside EU. It also needs to up-skill the current workforce with the skills they need to exploit AI rather than compete with it.



Europe will succeed only if there is a broad social acceptance for AI and it should therefore prepare and encourage its companies and citizens to become involved, whilst mitigating potential risks.

In terms of venture capital investments in AI, the situation is improving in Europe with VC investments in European AI companies increasing significantly in 2017. However the stakes are increasing with high-profile global investment initiatives targeting AI such as Softbank's Vision Fund, and Europe needs to keep this momentum in order to remain competitive. Europe needs sufficient capital supply both in the venture capital segment as well as for long-term R&D and it needs to scale-up and better coordinate existing strengths on large-scale AI research and innovation. The public sector should become an early adopter of AI to

improve public services and to demonstrate that AI can yield tangible benefits to citizens and while there is no need for AI-specific regulation, action is required in some areas to make the existing regulatory framework applicable to AI.

As a wealth of valuable data is being created in Europe by governments, industry, and citizens, Europe must make this data available for training AI applications, especially by having governments boost open-data policies. Lastly, an industry-led "code of conduct of good AI business practices" would ensure AI development respect European values and ethical and legal standards.

Andreas Tegge, Head of Global Government Relations at SAP

Artificial intelligence will be an enabler for innovation, productivity, and economic growth as it will drive core business processes, enabling humans to focus on higher-quality work. AI will also help address societal challenges in areas such as healthcare, public security, and disaster management and so Europe must be at the forefront of AI developments to ensure future competitiveness and well-being.

AI does however raise public concerns such as impact on jobs or loss of human control in automated decision-making. In practice, several of these concerns relate to cases that may or may not occur in the distant future, meaning that the "dark" factory or the "dark" office taken over by AI and run without any human intervention is more fiction than fact. Nevertheless, these concerns must be taken seriously and AI development must respect European values and legal standards as the success of AI in Europe will depend on its broad social acceptance. Europe has the potential to compete with the United States and China in the global race for AI leadership and one area specifically where Europe can and must lead is the emerging AI business-to-business market and the development of the intelligent enterprise.

SAP therefore proposes that, firstly, policy makers should start an informed dialogue with all relevant stakeholders to discuss concerns about AI openly and agree on common measures to exploit the potential of AI. This inclusive approach will be essential to ensure social acceptance for the disruptive technology. Secondly, AI will have an impact on the labour market as jobs will be changed or, in

extreme cases, eliminated by machines. New jobs will be created, and many jobs will be transformed through AI. The future of work will be marked by human-machine collaboration and we must therefore provide employees in Europe with the skills they need to exploit AI rather than compete with it. Thirdly, large-scale AI research and innovation clusters should be established in Europe that can compete with those in the United States and China. There are promising AI programs at several research institutions in Europe that need to be scaled and better coordinated at the European level.

Furthermore, policy makers must ensure a favourable EU regulatory framework that establishes a single market for AI products and services, provides legal certainty, and addresses AI-related risks. Another important area is the availability of training data for AI as the greater the volume of data available, the more algorithms can learn and the better AI offerings will be. A wealth of valuable data is being created in Europe by governments, industry, and citizens. We must make this data available for AI applications, especially by having governments boost open-data policies.

Industry should also do its part to address AI concerns. SAP proposes the creation of a “code of conduct of good AI business practices” to help ensure AI development respects European values and ethical and legal standards. Small and midsize enterprises (SMEs) are the backbone of the European economy and so fostering broad and speedy AI adoption by SMEs should be a priority.

The public sector should become an early adopter of AI to improve public services and to demonstrate that AI can yield tangible benefits to citizens and the emerging global market for AI products and services will provide tremendous business opportunities for European industry. Unfortunately, digital protectionism is on the rise, especially in emerging markets. Therefore, any European AI strategy should strive to ensure a level playing field and open AI markets for European industry countries outside the European Union.

SAP believes that integrating AI into business processes will yield tremendous efficiency gains, drive innovation, and enable new business models. Human centrism is a core principle of SAP’s vision of the intelligent enterprise and aligns with our overall mission to help the world run better and improve people’s lives.

Juha Lehtola, VC investments at European Investment Fund

While Europe is in a catch-up mode versus US and Asia in terms of investments in AI, the situation is improving notably in terms of venture capital investments where the investor community is increasingly learning to appreciate the high quality scientific and talent pool available in Europe. As a result, VC investments in European AI companies increased significantly in 2017. However the stakes are increasing as there are larger and larger global investment initiatives targeting the AI sector among others, such as Softbank’s Vision Fund, and Europe therefore needs to keep this momentum in order to remain competitive. Particular attention needs to be paid on a sufficient capital supply both in the venture capital segment, including where the public money should complement and co-invest with private capital, as well as the long-term R&D funding such as grants and loans.

AI technologies require a specialised talent pool, which at present is a scarcity. Europe must not create any obstacles for the free and dynamic movement of talent from outside EU to where opportunities exist.

While Europe may not be able to compete in the race of computing platforms for AI as the market is heavily dominated by US vendors such as IBM and Amazon, some of the industry verticals that witness the highest impact from AI, such as healthcare and automotive, are strongly present in Europe. It is therefore of the utmost importance that these industries do not lose their competitive advantage by under-investing in AI. Finding ways to facilitate adoption of AI innovations generated in Europe both within the public sector as well as corporations will benefit both the SMEs as well as large organisations.

Andrea Renda, Senior Research Fellow and Head of Global Governance, Regulation, Innovation and the Digital Economy at the Centre for European Policy Studies

Artificial Intelligence today is mostly about two activities: optimisation and prediction. Optimisation applies to specific sectors, such as supply chains, logistics and maintenance. Prediction can be obtained in different ways, such as through massive data inputs such as big data analytics, through self-generated experience or through the emulation of neural networks and the application of high performance computing. None of these are really definitions of intelligence, but instead they are about machine learning with no comprehension. There is no evidence that singularity will ever happen.

The rise of AI creates ethical and policy challenges. On the side of ethics, it is important to decide firstly, how to preserve human control over the internet, secondly whether algorithms should behave like us or better than us, thus reducing the bias that already exists in society, thirdly whether algorithm developers should have input accountability and lastly whether the liability scheme for damages caused by robots should replicate the legal rules we have for defective products, for damages caused by animals, or otherwise be subject to a brand new legal system. In all cases, a strict liability regime would apply, but the question of whether there should be exceptions to the liability remains.

Policy challenges include the relationship with the labour market. AI will end up destroying jobs, no matter how fast we are to re-skill citizens. It is high time to discuss how to reorganise work in a way that preserves social cohesion.

There are still choices to be made, before AI disrupts everything. The European Commission is right to endorse a smooth, harmonious, human-friendly development of AI. Recent accidents such as the one in Tempe, Arizona, involving an Uber-operated Volvo car shows that when it comes to self-driving cars, there is no need for speed.

Robert Spicer, CEO at vyzVoice

The regulation of Artificial Intelligence specifically as a tool is not recommended. Regulation, as it is today under negligence or tort law for products, should be assessed and implemented on the outcome rather than the component parts and policies surrounding it. AI regulation should also be created within flexible frameworks that can be interpreted as advancements made in the field. This is likened to a constitution that is the foundation of the current law. The current laws may always change based on the current interpretation of the constitution, but the constitutional framework seldom changes in and of itself.

Regulation at this developmental stage of AI would have a chilling effect on innovation and commercial viability of future opportunities. Building rigid frameworks, policies and regulation that hinder the exploration of AI's multifaceted applications will only serve to hinder the growth of beneficial uses of AI. This negative effect would create enormous secondary effects that are regionally detrimental. First and foremost, competition to fill the innovation space would be won by the Chinese and would relegate the EU to third or fourth position. This, in turn, would create a "third world" or "digital divide" effect for the EU both militarily and commercially.

Philippe Brunet, Director for Space Policy, Copernicus and Defence, DG GROW

Space reinforces Europe's role as a strong global player and is an asset for its security and defence. The overall international space context is changing fast as competition is increasing, new entrants are bringing challenges and new ambitions in space, space activities are becoming increasingly

commercial with greater private sector involvement and major technological shifts are disrupting traditional industrial and business models in the sector, thus reducing the cost of accessing and using space. The combination of space data with digital technologies and other sources of data open up many business opportunities for all Member States.

Space and Artificial Intelligence constitute two strategic domains that are revolutionising our economy. Space uses artificial intelligence and artificial intelligence can benefit from space advances. Space relies on artificial intelligence for advanced machine learning techniques for the interpretation of space data and for autonomous space-based systems. Machine learning depends on vast amounts of data for training the algorithms and abundant free data from space systems such as Copernicus and Galileo can therefore be used for training AI systems.

Since 2015, Copernicus has generated more than 5 petabytes of satellite data, which is an amount that will increase to more than 10 petabytes per year from 2020 onwards. Copernicus services have embedded Artificial Intelligence, machine learning and pattern recognition techniques for the generation of advanced information from satellite observations, such as oil spill detection, crop detection and deforestation. Understanding the importance of collating its large amount of data with powerful computing environment, Copernicus is financing several cloud processing services named DIAS, that allow users to produce their own value adding services that apply Big Data tools to Copernicus data and information.

INVESTING IN STRATEGIC VALUE CHAINS FOR EUROPE

Antonello Lapalorcia, Italian Ministry of Economic Development

Size and risk matter. Very large and very risky projects could hardly take place in Europe at national level only with private funds. Public intervention is inevitable. Should this be the case, this would create a serious distortion of intra UE competition and they would have to comply with very stringent EU State aid rules. Important Projects of Common European Interest, also known as IPCEI, is the perfect tool to overcome this problem as it puts together all interested enterprises and member States, including the European Commission.

IPCEI is not a generic definition. It is embedded in article 107.2.b TFEU on State aids. The Commission's Guidelines go far beyond that and make IPCEI "a dream that might never come true". Several adjustments are necessary to make IPCEI a real tool of the renewed industrial policy strategy. The Strategic Forum should formulate recommendations in this sense.

Small and medium sized enterprises represent 99% of all business in the EU. It is not easy for SMEs to succeed in global value chains, and there are two main factors that require attention. The first is enterprise competitiveness. The second is enterprise connectivity, or the means by which firms can connect to value chains. To help SMEs build capacity and develop strategy for effective integration into strategic value chains, we need to guarantee new financing solutions, the right business environment and an adequate public-private partnership framework.

Frank Treppe, president of EARTO, Director of Corporate Strategy and International Affairs of the Fraunhofer Gesellschaft

To strengthen value chains in Europe we need a holistic framework which supports the need to speed up the transfer from research results to real industrial applications. This holistic approach should include the following. Firstly, the funding of key enabling technologies under a dedicated programme to make Europe's companies "fit for new technologies" and it should support industrial

deployment of key technologies in Europe. Secondly, funding and cherry picking promising disruptive technologies to encourage taking higher risks in research projects and allow early failures and to define research missions which stimulate the set-up of leading companies in Europe. Thirdly, the establishment of an EU strategy and funding programme for technology infrastructures should be set up. Innovative technology infrastructures can help companies to experiment, test and validate. We also need real infrastructure to speed up deployment of new technologies as well as a European approach on Industrial Infrastructures for Research and Innovation. Finally, promoting IPCEIs is a crucial element to strengthen value chains. This will enable us to strengthen European Industries' capacities to absorb and scale up the technologies that have matured into new products and services.

Frédéric Saint-Geours, Chairman of the Supervisory Board of SNCF

Positioning Europe in emerging or high growth potential sectors is of vital importance, as European industry is facing industrial challenges in a globalized economy. It is the only way to ensure the strategic autonomy of Europe.

The European strategy on value chains must be holistic, mobilise all European policies and make recommendations on all available European instruments.

SMEs must have the means to collaborate with key players in both industry and research, and to carry their digital transformation.

Even if IPCEIs are only one of the tools to strengthen European value chains, it is a concept that needs to be developed and even expanded, provided that they meet the needs of European industry, and that they are coordinated.

Niklas Johansson, State Secretary to the Swedish Ministry of Enterprise and Innovation

Sustainability is a prerequisite for both future competitiveness and wellbeing. Major business opportunities can be harnessed for providers of innovative, resource-efficient and environmentally friendly goods, services and systems. EU industry must both contribute to the climate goals and capitalise on new opportunities. Objectives and indicators for following up EU industrial policy need to reflect both goals.

From battery production to smart grids, minerals and metals are necessary for technologies that reduce carbon emissions. These minerals and metals must be produced in a sustainable manner including environmentally safe handling of chemicals and waste. Today, the EU depends on unsustainable imports. To achieve a sustainable supply of innovation-critical raw materials, the EU must reduce the institutional risks for investments that depend on the use of land and water, and improve coherence between environmental and investment-promoting policies.



To be competitive means embracing change. Innovation must therefore be at the heart of industrial policy. The next EU framework programme for research and innovation is an important tool. The new program should continue to integrate research and innovation, promote European industrial leadership, support wider use of test and demonstration facilities, and take proper consideration of the whole value chain, including raw and recycled materials.

Sabine Herlitschka, CEO of Infineon Technologies AG, Austria and member of the High Level Group on industrial technologies (RTD HLG on KETs)

Our global context has changed and turned technological competence and strength into the decisive strategic factor. Strategic Value Chains build on core research and technological competencies – Key Enabling Technologies (KET). KETs are essential, pervasive and typically system-relevant building blocks in almost all industrial sectors. In particular, the combination of research and development as well as manufacturing in Europe is of substantial importance. Applying the logic of Strategic Value Chains enables global European leadership, while at the same time represents a measure ensuring Europe's autonomy and security.

In order to make strategic value chains stronger in Europe the following activities at EU level are necessary. Firstly, a clear awareness for strategic competencies and focus of activities is needed. This applies to many policy areas of intervention, including research & development, innovation and trade and external relations. Incentives should be developed for Strategic Value Chains that are made in Europe and that are fit for global competition. Furthermore, awareness for strategically important technological competencies to be kept in Europe in the course of global merger and acquisition developments. In this respect, the Commission proposal for a foreign direct investment screening would be useful for Europe.

Joint investments in new industrial capabilities by Member States are necessary in order to join European forces and generate real critical mass by global standards. European State Aid rules are nowadays still too focused on inner-European competition aspects only. They have to be modernized further in order to better contribute to making Europe fit for global competition. IPCEI is a suitable approach, however implementation has to be made significantly faster and straight forward.

ROLE OF SKILLS IN FUTURE EMPLOYMENT

The skills of our workforce will be decisive for keeping the competitiveness in Europe and for having a sound social Pillar.

At the same time 40% of employees have difficulties to find a job; digital skills are required for 90% of existing jobs, but 40% of the workforce has low or no digital skills and life-long learning is more important than ever. By 2030, it is anticipated that around 14 new million jobs will be created in particular in high-skilled non manual occupations. The growing platform economy requires more analysis with people not being employed anymore, but increasingly hired for specific project tasks.

The speed of skills changes, such as digital skills makes it difficult to deliver EU funds, such as the ESF at an adapted pace. To improve ESF delivery in some Member States institutional building and institutional reforms should ideally be carried out first adapted to serve citizens and unemployed, such as in Bulgaria and Romania. Beyond political correct themes, skills need to reflect labour market needs.

For manufacturing jobs there is an increased demand for business and administration professionals, plant and machine operators, science and engineering professionals. However, the digital transition has not happened yet and people have to be equipped with transition skills to master the change.

On the demand side, there is a dynamic change, such as tech skills not limited to tech sector but rather all sectors, big data analysts, soft skills, fitness professionals and real estate agents, while on the skills supply side there is less change and this gap is rising over time.

Implementing the Blueprint can be facilitated by reducing red tape for SMEs and VET providers at regional level and there is a need to foster links with R&D and other policy areas.

The human element is key: humans are not replaceable and robots will support humans in job and skills related tasks. New emerging technologies make learning easier, such as augmented virtual reality and gaming and industry needs to support training on the job in different ways.

Coding skills are growing in significance, for example all employees at General Electric are required to learn coding, not just the production workers. Entrepreneurial skills and creativity are talked about a lot, but not yet broadly implemented, and vocational training providers, employers and schools need to be targeted to develop a common vision.

There is an information overload and therefore need for better career guidance and access to the right information at the right time. It is important to boost the attractiveness to participate in vocational training and lifelong learning for young learners and adults, including through promotional campaigns like the European Vocational Skills Week

The key outcome of the session is that the European Social Fund has a bigger role to play in the context of industrial modernisation and we all agree that we need to change the way skills development is organised.

Donald Storrie, Eurofound's Chief Researcher

Secular decline in manufacturing employment, but since 2011 some significant increase. Recent manufacturing employment growth rates highly skewed towards relatively high wage occupations, not least in EU15

Among the top 10 manufacturing jobs with strongest growth rate, in large jobs a 2 digit occupation in a 2 digit sector employing more than 100,000 people, 5 include science and engineering professionals. The highest growth rate was found for business and administration professionals in the sector of the manufacture of machinery and equipment.

In a study of 5 Game Changing Technologies in the Eurofound 'The Future of Manufacturing in Europe' Pilot Project, emerging skill needs for Advanced Industrial Robotics, are those that combine ICT and engineering skills. The slides that accompanied the presentation provide some detail on these and other skills.

Alena Zukersteinova, expert, CEDEFOP

The new 2018 Cedefop forecast estimates that from now until 2030, there will be around 14 million new jobs created in EU28. Out of these, more than 8 out of 10 will be created for jobs related to the higher end of the skills spectrum such as managerial, professional and associate professional occupations. The number of non-manual skilled jobs is also expected to increase by almost 1 million due to the high demand for occupations in service activities such as sales. On the other hand, job losses will occur for skilled manual occupations such as craft and skilled agricultural workers. Some 3 million new jobs will also be created for elementary occupations such as cleaners and agricultural

labourers. However, once the need to replace existing workers is estimated, then a total of more than 150 million job opportunities are expected to arise over the forecast period.

Europe needs to prepare itself for changes in skill demands that will arise from the digitalisation, artificial intelligence and robotics in our economies and societies. Cedefop's European Skills and Jobs Survey highlights that 43% of adult employees have recently experienced changes in the technologies they use at work and 47% saw changes in their working methods or practices. About one in five considers it very likely that several of their skills will become outdated in the next five years.

Changing technologies and structural economic change are expected to demand more cognitive and interpersonal skills in future workplaces. Individuals who can survive and thrive in the digital economy, and those suited to the skill requirements of future jobs, are those who do not only possess good digital skills, but also a healthy mix of cognitive and socioemotional skills such as problem-solving, creativity, communication and collaboration.

Elin McCallum, Director, Bantani Education

Skills are at the core of a changing world. As jobs become more automated so it is the ability to adapt and innovate using entrepreneurial skills and an innovative and creative mind-set that will become more important.

[EntreComp](#) is a new EU competence framework that outlines the skills and attitudes needed to be more entrepreneurial in this changing world. It crucially provides the structured understanding that educators and education systems need to make these skills a learning priority. It emphasises the importance learners developing the skills they need to create new value, in their own lives, for society, through cultural actions or in business.

If skills mismatches impede the ability of companies to grow, then traditional education structures and systems impede educators' ability to implement this new type of learning. There needs to be a focus on testing applied and changing knowledge-based challenges – where the process of learning, failing, learning and failing again is celebrated, to include the how and why, not purely the what of learning.

Yet this has been an increasingly more vocal and research-based debate for many years, but with little concrete change in education systems across Europe. What we value in education seems still to be achieving top grades and the final qualification, and few recognise how a student has practiced creativity, developed better resilience or build self-understanding. These are the traits of entrepreneurial citizens, a diverse group of young people who have worked on the skills they will need to be ethical, pro-active and creative-thinking citizens, employees and entrepreneurs.

To revolutionise the education system and the learning that it values, acting fast is necessary. As citizens, parents, grandparents, and businesspeople, we all have a stake.

Mirek Pospisil, EU Public Policy and Government Affairs Manager, LinkedIn

The ability to analyse the labour market and its evolution in an unprecedentedly granular way down to the skills level, is one of the unique advantages of LinkedIn data. Thanks to our Economic Graph, a digital map of the global labour market which maps connections between members, companies, jobs, skills, and education institutions, we are able to identify where particular skills are located, whether they are in shortage or in surplus, which skills are emerging, growing rapidly, or which are shrinking in popularity and demand. We can also identify the skills that are moving from one location to another, be it at the city, region, country level or beyond.

This ability to build a unique skills profile of a concrete geographical location, a job function, or an industry constitutes an invaluable asset when it comes to designing and implementing labour and education policies that respond to the developments of our economies. The Economic Graph data has the potential to help navigate the fast-transforming employment landscape in Europe and provide actionable insights with regards to digitisation and its impact on skills needs.

Empowering policymakers with these insights so that they can make timely, informed, and targeted decisions when managing their labour markets is at the heart of our company's vision - to create economic opportunity for every member of the workforce.

We believe that real-time analysis of labour market data, which complements existing information about local workforces with more depth, nuance and timeliness not often available through publicly available statistics, will help ensure that our industries avail of the opportunities presented by the Fourth Industrial Revolution and remain competitive internationally.

Francesco Marchi, Director of Economic Affairs, EURATEX, Blueprint for sectoral cooperation on skills: textiles

Skills development should be at the heart of EU, Member State and regional policies and adequate support measures for the upskilling of citizens should be more visible considering the industry presence at regional level, including where Vocational Education and Training providers are not present.

Simplifying the legal and financial framework to support more effectively SMEs for a quantum leap in upskilling and re-skilling is needed and, in parallel, the rapid recognition of profiles at Member State and regional level to promote mobility and attract new talents should be encouraged.

The engagement of all stakeholders is paramount to overcome these issues and they should be accompanied by a strong and positive image of the manufacturing industry.

IV. CONCLUSIONS

Lowri Evans, Director-General for the Internal Market, Industry, Entrepreneurship and SMEs

This was a highly positive event, with close collaboration, co-ownership and co-creation being the driving force. I have never heard so many high level participants engaging in an open way about where Europe should be going on the many vectors of industry policy. This is great timing, just before we finalise the Commission's MFF proposals. There is a wide understanding of what the Commission has been doing so far, but stakeholders also want us to be more ambitious. They see the next MFF as an opportunity to make EU and national and regional funding more effective.

Industry is central to Europe's economy and is ready to play a stronger role for society, including skills development and 'learning factories', sustainability and the circular economy. European industry is also well placed to respond to societal needs and assume responsibility for the future of people, and the planet.

In order to remain globally competitive and in order to deliver growth for everyone, the EU economy needs to remain open, but we should not be naïve: free trade needs to be rules-based. We need to be better prepared to anticipate change in global trade, business models, technological transformation and in particular skills, to ensure that no one is left behind.

Key enabling technologies, including artificial intelligence, secure and connecting technologies which might be included in the KETs, offer big opportunities for the future of work and business. They are drivers of innovation.

To make this happen in Europe, we have to stimulate entrepreneurship, creativity and the adoption and uptake of technologies in the industrial ecosystem. We need to provide a framework for innovation and co-creation at EU level. The local and regional dimensions are as important as the global one: with clusters and inter-regional collaboration to accelerate industrial modernisation and create critical mass for the diffusion of technologies, we need to speed up.

We heard a lot about the next European budget for 2020-2027 and its role to help spark industrial modernisation. This is an opportunity to make EU, national and regional funding more effective. We also heard a lot about FP9 and the importance of industrial presence in the Research and Innovation programme and we will take that message on board. Smart specialisation and cohesion funds are also essential for the diffusion of innovation across the regions to ensure that no European region is left behind. Moreover, the role of the European Social Fund should be strengthened in the context of industrial transformation, since we all agree that we need to change the way skills development is organised.

Europe is in a great starting position. We have highly educated people and the best scientists in the world. We also have great industry players, small medium sized businesses and start-ups. But to succeed in our ambitious strategy, we all need to come together and speed up our efforts, as without that, we will not be able to win the race.

V. HIGHLIGHTS OF THE LOCAL EVENTS

EUROPE FOR THE GROWTH OF YOUR BUSINESS: INSTRUMENTS, INCENTIVES AND SUCCESS STORIES

When: 22nd February 2018

Where: Alba, Italy

Organised by: Confindustria Lecco e Sondrio, Unindustria Como

The European Union offers companies many tools to grow in research and innovation. They are complex and competitive instruments, but the companies of the territory have great potential and the actors equipped to support them in the best way.

INDUSTRIAL TRANSFORMATION: UNDERSTANDING THE REAL DRIVERS FOR CHANGE

When: 20th February 2018

Where: Brussels

Organised by: European Policy Centre (EPC)

Key discussion of the event covered the main challenges to industry and drivers for success today, how trends such as automation, digitalisation, trade, climate change and competition over resources are affecting and transforming European industries and job prospects and the measures that can help maximise opportunities and mitigate the risks associated with ongoing industrial transformations.

HIGH TIME FOR HI-TECH

When: 20th February 2018

Where: Sofia, Bulgaria

Organised by: CASTRA, Hosted by EC Representation

The cooperation among industry, academia and NGOs is identified as a key prerequisite for innovation leading to growth and jobs. The support for clusters can have an effect if also being 'smart', meaning in-line with the smart specialisation strategy. The support for the mechatronic and clean technology domains could develop regionally, based on the links of the Bulgarian North with Romania and using ICT for leverage Satellite Data has tremendous volume and uses, including as a basis for entrepreneurship and new projects.

MULTI-MATERIALS MANUFACTURING

When: 21st February 2018

Where: Brussels

Organised by: ComMUnion project and AIMEN with the collaboration of Flexhyjoin and Lay2form projects

This workshop covered Multi-Material Manufacturing and highlighted it as a research field with high potential for many sectors and with a growing interest from the Industry. Topics such as manufacturing and joining are very challenging and exploiting and implementing the project results can therefore be very difficult.

INVESTING IN THE EUROPEAN TOURISM OF TOMORROW

When: 22nd February 2018

Where: Brussels

Organised by: The Digitalisation and Safety for Tourism (NECSTouR)

During the event, stakeholders expressed their willingness to support the Partnerships further. Amadeus, for example, expressed its willingness to support the Partnership through the Advisory role. Moreover, throughout the event it was obvious that tourism is on the high-level agenda for the present policy makers. Tourism is becoming a key, strategic sector for the EU and there will be specific funding lines assigned to this area in the near future, as pushing towards larger investments in the European Fund for Tourism is becoming more and more realistic. There are similar initiatives ongoing at regional or national level but there is no umbrella initiative that would put them all in the same category.

The event concluded that the breaking of silos is absolutely crucial and that there is an opportunity for the Partnership to push for a pilot with the European Parliament, once the investment project idea is clear. It also stated that new technologies, consumer habits and trends as well as more innovation driven tourism with aligned capacities is needed in order to be able to respond to the challenges of the Tourism industry for today and for the future.

POLITICAL AND SOCIAL AWARENESS ON WATER ENVIRONMENTAL CHALLENGES

When: February 2018

Where: United Kingdom

Organised by: POWER H2020

The webinar format for the industry panel proved to be very useful and beneficial for the attendees. During the panel the key issues addressed in the project were discussed with the industry representatives. This provided additional insight for the project partners and the POWER consortium members profited from the opportunity to discuss their water challenges with industry specialists. Moreover, the attendees learnt more about the POWER project itself. Some of them express interest in becoming the followers of case studies in the project.

INVESTING DAY FOR EUROPEAN CYBER SECURITY COMPANIES

When: 27th February 2018

Where: Paris

Organised by: The European Cyber Security Organisation

A first limited event in Tallinn to join start-ups and investors through the ECSO network gave initial positive fruits. A second event in Brussels gathering international banks, new investment funds and some SMEs has shown the strong increased interest and participation. This third event in Paris has more than double expectations in participation and has been widened to participants from other EU countries. Europe urgently needs to get organised and support its best SMEs and Start-ups with innovative technologies and services. ECSO wants to close the gap and support operationally such important development. The possible creation of a “European investment fund” for SMEs and Start-ups is just one of the short-term objectives we have.

SUPPORTING START-UPS AND SMEs IN THE ENERGY TRANSITION

When: 21st February 2018

Where: Brussels

Organised by: The International Climate Show and the Jacques Delors Institute

First and foremost, innovation stems from people that are becoming the innovators, the makers that perform innovation. Innovation may furthermore require technology. It always requires financing, and the issue with public financing is to make it as accessible as possible, while being as scrutinised as necessary to avoid misuse of taxpayers' money. Finally, regulation can play a big role in accelerating clean energy innovation in Europe, from the local to EU level.

THE IMPORTANCE OF RESEARCH FOR THE EU FOOD AND DRINK INDUSTRY

When: February 2018

Where: Brussels

Organised by: FoodDrinkEurope

There is an increasing public interest in how food is produced and how the food system operates. Food production is at the centre of many societal challenges and R&I offers important opportunities to solve the current problems and boost the competitiveness of the food industry. In order to succeed and ease the path from research to innovation, the different stakeholders (policy makers, industry, citizens, etc.) that will be part of the solution need to be mobilised. Responsible Research and Innovation practices can enable this dialogue and help shape common visions for the future of R&I in the food sector.

MANUFACTURING SKILLS & KNOWLEDGE DELIVERY MECHANISMS

When: March 2018

Where: Greece

Organised by: HEPHAESTUS Cluster & Laboratory for Manufacturing Systems and Automation (LMS)

This event investigated the challenges regarding skills that current and future industrial workforce face and discussed solutions on how these challenges can be addressed. The Teaching Factory concept was presented as a novel knowledge delivery mechanism that can efficiently educate and train the current and future industrial workforce.

The key conclusions underlined the variety of challenges that exist regarding workforce competencies and the skills that are missing are easily identifiable within EU countries. Additionally, accelerated technological evolution creates a dynamic environment and therefore novel, agile and adaptive knowledge delivery mechanisms utilising modern ICT need to be employed.



