

REPORT OF THE EPCA 2014 48TH ANNUAL MEETING

GLOBAL COMPETITIVENESS AND
THE CHEMICAL INDUSTRY: WHAT ABOUT EUROPE?

4 TO 8 OCTOBER 2014 IN VIENNA, AUSTRIA



THE EUROPEAN PETROCHEMICAL ASSOCIATION

MEETING





DAY 1: BUSINESS SESSION

GLOBAL COMPETITIVENESS AND
THE CHEMICAL INDUSTRY:
WHAT ABOUT EUROPE?

MONDAY 6 OCTOBER 2014

OFFICIAL OPENING



TOM CROTTY
EPCA President from June 2014
INEOS GROUP



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“We have a record number of registrations this year. Almost 2800,” said EPCA president Tom Crotty, welcoming delegates to Vienna. “But I’m not sure whether this is a sign of a recovery in the industry, or whether in the face of adversity it’s better to have strength in numbers!” Certainly, the global chemical industry is seeing seismic change, with massive shifts in global demand and in energy supply, Crotty noted. For this reason, the meeting’s presentations would focus on how the European petrochemical sector can remain competitive in the face of these changes and the new challenges they bring.

When EPCA met in Vienna back in 2005, the focus was on the impact of investment in low-cost Middle East production capacity. There were predictions that a tsunami wave of imports would herald the demise of European petrochemicals, the Ineos director recalled. “But it didn’t happen, because China mopped up this production.” However, today’s picture is very different. China has invested heavily in base chemicals production and its economic growth is slowing, which is impacting imports. Furthermore, Crotty

continued, the development of shale gas has transformed the competitiveness of the US chemical industry, and now Europe faces a potential wave of imports from two regions benefiting from low-cost production.

At this point, he put the meeting into the hands of moderator Nadine Dereza to introduce the speakers to offer their perspectives on the competitive challenges facing their companies and the industry and how best to respond.



NADINE DEREZA
Moderator

KEYNOTE SPEAKERS



GRAHAM VAN'T HOFF
Executive Vice-President
SHELL CHEMICALS

VISION OF AN UPSTREAM INTEGRATED GLOBAL CHEMICAL PRODUCER

Does Europe's chemical industry have the right ingredients to stay competitive despite the region's difficult economic struggles? This was the question posed by the annual meeting's first keynote speaker, Graham van't Hoff, Shell Chemicals' executive vice-president.

He believes it does, but sees two major challenges – the cost of production, and the potential threat of North American shale gas. To these, he identified six key responses: leveraging clusters, technology investment, refinery integration, advantaged feedstock, a better industry image, and gaining the support of policymakers. If the industry gets it right, the Shell executive believes the chemicals sector “can play a key role in re-industrializing Europe and in securing a sustainable future for the region.”

When van't Hoff joined the industry in 1984, there were fears that new Middle East production capacity based on cheap feedstocks would destroy the European petrochemicals sector by 2000. However, “Today, the European chemicals industry appears to be alive and kicking. It is a €558 billion industry providing over 1 million direct and nearly 5 million indirect jobs in Europe.” But while Europe's chemical sales have doubled since 1992, its market share fell from 30.5% in 2002 to just 17.8% in 2012.

Did Europe get lucky, or take measures to remain competitive? Probably a combination of both, said van't Hoff. As Middle East production grew rapidly, demand in Asia, and particularly China, also grew well ahead of expectations. Europe also had some good fundamentals, including highly energy-efficient plants, a productive labor force, and a vast, differentiated product portfolio.

Today, Europe has to grapple with increased production costs, including feedstock, fixed and variable costs. For example, IHS reckons that in 2008 an average European cracker cost 20% more than its global equivalent, van't Hoff noted. By 2014, this cost gap had risen to 45%, and by 2018 is expected to be

“THE CHEMICALS SECTOR CAN PLAY A KEY ROLE IN RE-INDUSTRIALIZING EUROPE AND IN SECURING A SUSTAINABLE FUTURE FOR THE REGION.”

at least 55%, due mainly to hydrocarbon and energy costs. Europe also faces a widening energy cost gap: industrial electricity prices are more than double US prices, and 20% higher than China's; industrial gas prices are 3 to 4 times above US and Russian prices, and 12% higher than in China. Given the close relationship between chemicals and manufacturing industries, rising energy costs will have impacts across Europe's economy.

“While the availability of ethane in the Middle East is now clearly less abundant,”

the Shell executive said, “North America has re-established itself as a low-cost petrochemical manufacturing region due to the so-called ‘shale revolution’. Since 2009, absolute price differentials between hydrocarbon streams have increased, and recent crude-gas spreads of \$14/mmbtu (oil vs. Henry Hub) have created a particular downside for the European chemical industry. These crude-gas spreads are expected to continue and favor US ethane crackers against European naphtha crackers.”

Planned new crackers based on cheap ethane feeds plans could raise US ethylene capacity 40% to around 40 million t/y, and make North America a major ethylene derivatives exporter, said van't Hoff. South America and Europe would likely each receive 40% of these exports, with China being the destination of last resort, in part due to the Middle East's freight advantage. With US PE imports into Europe expected to double to 4 million t/y in 5-7 years, Europe could be facing PE capacity cuts of up to 2 million t/y, and knock-on cracker rationalization.

However, the outlook is not totally gloomy, said the Shell Chemicals EVP. North America looks to be facing steep cost increases, skilled labor shortages and productivity challenges, which may check exports. Many North American players have major plants in Europe, which may be limiting US shale gas impacts in Europe, although US companies could cut European output and import instead.

Having outlined these two key challenges, van't Hoff suggested how Europe's chemical industry should respond, by building on strong fundamentals to enhance competitiveness. “We should continue to leverage our clusters...such as the Antwerp-Rotterdam and Rhein-Ruhr clusters, down to Ludwigshafen and Marl,” said the Shell manager. Competitive clusters are more robust, as they are well integrated in terms of logistics, ownership and derivative units; and they have low cost to serve.



GRAHAM VAN'T HOFF
Executive Vice-President
SHELL CHEMICALS

However, smaller clusters with fragmented ownership may struggle, and producers with less derivatives integration would be more exposed to the merchant market and need to secure enough contractual volume to ensure full asset utilization.

Van't Hoff also pointed to significant value in integrating refineries and petrochemical plants. Shell, for example, draws strength from mega sites in the Netherlands, the US Gulf Coast, and Singapore, and continues to invest in enhanced integration between Moerdijk plants and the Pernis refinery, and in Rheinland. He continued: "Globally, chemicals has and is expected to continue to be a high-growth hydrocarbon outlet, with growth forecast at 50% over the next 10 years, compared to oil products at 10%. In Western Europe, chemical demand is stagnating, but fuels demand is worse, declining at 3% per year." Europe – like many other regions – has surplus gasoline, with no obvious 'new home' for that extra volume. An efficient refiner would switch its attention to aromatics and discover growth and margins from petrochemicals.

"WE SHOULD CONTINUE TO LEVERAGE OUR CLUSTERS... SUCH AS THE ANTWERP-ROTTERDAM AND RHEIN-RUHR CLUSTERS, DOWN TO LUDWIGSHAFEN AND MARL."

Producers should also seek more advantaged, lighter feedstock, such as LPG, although structural changes are required for feedstock flexibility. From 2010 to 2013, natural gas liquid (NGL) cracking rose 13% to 31%, with coastal plants accounting for about 41%, and non-coastal for only 13%.

The first wave of Europe's 'going lighter' strategy was mainly through LPG; the second wave is through cracking imported ethane.

However, not everyone can import ethane, as investments in onshore logistics, vessels, and import facilities are required, making it a viable option only for a few water-based locations with easily adaptable cracker infrastructure.

Beyond feedstocks, the industry must continue to invest in developing chemicals technology – for more efficient and flexible production, new products and a greener

global economy. It must also work harder to tackle its image problem with stakeholders, and make policymakers understand its key role in economic growth, and that competitiveness needs to be the touchstone for all EU policies.

"Europe needs coherent, non-conflicting energy and climate policies, aligned across the EU, that deliver secure and competitively-priced energy, without creating an overly burdensome regulatory environment," said van't Hoff. He also said Europe needs a consistent and predictable legislative framework that does not drive away investment, and urged a focus on regulatory efficiency. "The cost of compliance with REACH should be addressed and other national and EU legislative initiatives should be consistent with this objective. These should be streamlined, so as to deliver

the same level of protection to workers and consumers, but at the lowest possible cost. And the conditions and needs of small and medium-sized enterprise have to be taken into account in such a process."

The Shell executive also urged the EU to step up its support and encouragement for young people to choose a scientific education, and fully implement the single market for jobs.



DANIELE FERRARI
Chief Executive Officer
 VERSALIS SpA
and Chairman
 MATRICA SpA

**VISION OF A REGIONAL
 PETROCHEMICAL PRODUCER UNDER
 TRANSFORMATION**

Opening his presentation, Daniele Ferrari noted that the European chemical industry is struggling, and is threatened by a number of “game changing” developments impacting competitiveness.

North American producers have seen their energy costs reduced by shale gas, which could account for 35% of US energy production in 2035, and will increase US exports of gas and polyolefins. The Middle East has access to low-cost feedstocks and is increasing integrated downstream capacity, while China continues to invest in chemicals production. But he said it is also important to recognize the impact of Latin America’s focus on renewable feedstocks. The region is already producing about 33% of the world’s bioplastics, and renewable feeds offer big opportunities for the Brazilian petrochemical industry.

Despite being energy-efficient producers, European manufacturers are losing competitiveness in the face of a “deadly spiral” of related energy factors, Ferrari continued. The spiral started with the boom in US shale gas production which had cut US gas prices, lowered US coal prices and seen a drop in CO₂ prices caused by the economic crisis, leading to more imports of US coal into Europe. This change in the European powergen mix has seen coal increase and gas decline, which is increasing CO₂ emissions despite over €60 billion in subsidies for the renewable energy sector. The end result is a dramatic energy cost gap, whereby in 2013 European gas prices

were three times higher than in the US and European power costs were double US levels.

In addition, the European industry has to cope with a strong institutional and bureaucratic burden, Ferrari said. “We have about 3 or 4 European Commission directorates overlapping on energy matters. We have 74 EU directives and regulations, and dozens of different national legislative initiatives. This situation is not sustainable. The EU’s 2020 energy policy was supposed to support competitiveness and sustainability. But it was based on some erroneous forecasting, and we’re not getting there.”

Versalis’s CEO said EU energy policy should be addressing a major issue: the lack of integration in the energy market. Today, there are 28 separate gas markets in the EU, when what is needed is a United States of Europe for gas. Europe already imports over 60% of its gas requirements and between 2020 and 2025 this is likely

“WHAT IS NEEDED IS A
 UNITED STATES OF EUROPE
 FOR GAS.”

to rise to 80%. What’s needed is a well-functioning and interconnected energy market to improve the competitiveness of the EU’s energy-intensive industry and the economy as a whole, Ferrari stated.

Energy is a really big deal for the chemical industry, which has already played its role in achieving efficiency, and reduced its energy intensity by 50% in the last 20 years despite increasing production by 60%. Now the EU is discussing a 40% reduction in greenhouse gas emissions by 2030, which would mean the industry achieving reductions of 70% from 1990 levels. “This is not sustainable, and an unrealistic target that risks further penalizing our industry,” Ferrari insisted. What

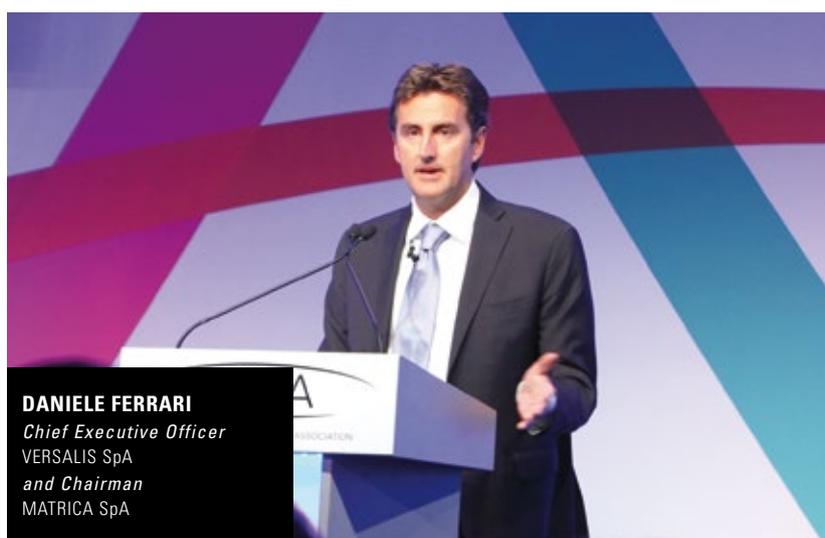
Europe needs is predictable, achievable, sustainable and integrated energy and climate policy, he said.

Right now, energy issues are putting European supply chains at risk, Ferrari continued. In plastics, for example, that means half a million jobs, and about €300 billion in turnover. Uncompetitive production factors in Europe will mean increased imports and relocation of players further down the value chain, he warned.

So what should the industry do in response? Ferrari suggested three key options. First, in the short-term, pursue right - sizing and integration, which requires rationalization and consolidation, and – further downstream – by increasing or realizing the value of by-products. Second, over the medium-term, look to improve flexibility, by using cheaper cracker feedstocks such as ethane, and by streamlining the supply chain. Third, over the long-term, focus on the transformation of the production base, by making “Brownfield” investment in new industrial platforms, and by increasing differentiation and/or switching to “Green” production.

Ferrari then turned to some of the consequences for Versalis of pursuing these options. He noted that the company has some particular challenges because it is only partially integrated and is not a global petrochemical player. However, he believes Versalis is increasing its competitiveness by making changes. “The most obvious choice for us was to optimise the asset base and have the right scale, and look for downstream integration and portfolio specialization.”

At Priolo, Versalis has improved integration, reducing ethylene cracking and closing the polyethylene assets, and focusing on some higher value products in the C9 and C5 chains, embarking on a technology joint venture. At Brindisi, which is already integrated with captive use of C2 and C4 cuts, the effort has been limited to feedstock flexibility and downstream further specialization of the product portfolio. Although it was unfortunate, Ferrari said that cracking and polyethylene facilities at Gela in Sicily, which were old and



DANIELE FERRARI
Chief Executive Officer
 VERSALIS SpA
and Chairman
 MATRICA SpA

uncompetitive, had been closed, and that the company's Sarroch facilities in Sardinia will be transferred and re-integrated with the adjacent SARAS refinery, according to a preliminary agreement signed last October.

Ferrari said the medium-term option of maximizing flexibility of lighter feeds is an interesting initiative. At Dunkerque, France, there is the potential to use ethane to produce up to 50% of ethylene from ethane. This will require some major logistics modifications – such as cryogenic storage and supply system – and changes to specific cracking elements.

Long-term sustainability requires a market-driven approach, Ferrari continued. By focusing on megatrends, it is possible to identify opportunities for alternative technology platforms related to energy, feedstock, environmental sustainability and intelligent materials. For that reason, Ferrari said, Versalis decided to develop integrated green platforms – via win-win plant reconversions – for new bio-based products at two of its sites.

At Porto Torres in Sardinia, the Versalis-Novamont joint venture, Matrica, has invested in an oxidation green chemistry platform, with a biorefinery-based integrated biochemical complex to produce biochemicals for

applications in bioplastics, biolubricants and personal care, and as additives for rubbers and polymers. At Porto Marghera, Venice, Versalis and its partner, Elevance, are jointly investing in a metathesis green chemistry platform to make specialty products for applications ranging from personal care, detergents and cleaners and biolubricants to high performance oilfield chemicals.

Ferrari said there are interesting opportunities for European petrochemical companies, which have strong technologies used in production worldwide, to work with technology developers in other sectors of the chemical industry, such as agrichemicals, to develop new technologies, such as biochemistry. He said **Europe is at the center of a virtuous cycle of technology, and the industry should work to preserve its global leadership in technology** through a focus on R&D, licensing, and protecting and developing intellectual property, while improving existing technology and developing new routes to production and products with enhanced performance qualities. The Versalis CEO said this is what his company is doing through its elastomers joint ventures with Lotte in South Korea and with Petronas in Malaysia.

Ferrari also noted that European companies have helped push the technical properties of

polyolefins far beyond earlier expectations, enabling them to penetrate into high performance applications in the energy, electronics, automotive, IT and construction sectors. Working with customers and other partners, the industry is transforming itself into a solution provider.

Bio-based chemistry offers the opportunity to create a circular business model, starting with agricultural materials that can be converted into valuable products, the Versalis chief executive said. He said it is possible to develop an efficient value chain – using non-food crops produced on marginal land and processed in smaller plants depending on regional, local or structural conditions – to maximize the exploitation of biomass. For its part, Versalis has partnered with Genomatica to develop a complete end-to-end process for biobutadiene production. Versalis will build the first commercial plant and the technology will be available for licensing, Ferrari said.

Before concluding, Ferrari mentioned the joint venture project Versalis has with Yulex to produce a range of products from guayule, a renewable and hardy non-food crop, from which a wide range of products can be manufactured, from rubbers and latex, to energy, soil and construction additives, biochemicals and pharmaceuticals, insecticides, and paints and coatings. Although he doesn't see bio-based chemicals replacing petrochemicals, Ferrari believes they do offer additional sources of value and opportunities to enhance competitiveness.

Concluding, Ferrari outlined four key routes to remaining competitive. Have a fully integrated up/downstream platform, with good geographical reach and an energy efficiency base in continuous evolution. Focus on capacity right-sizing and re-positioning, and take a fast and pragmatic approach to rationalization. Foster a deep research and innovation culture, and use it to generate regional megatrend-driven products and feed international growth. And finally, take an early adoptive and creative attitude towards renewable technologies, and target performance products based on specific building blocks.



PROFESSOR XAVIER SALA-I-MARTIN
Chief Economist & Senior Director,
 WORLD ECONOMIC FORUM
Editor of the WEF Competitiveness Report,
Professor of Economics at Columbia University

In an entertaining, thought provoking presentation, Xavier Sala-i-Martin, urged the chemical industry to pursue competitiveness through innovation. But he warned his audience not to confuse research and development as a substitute for innovation, or to confine the search for creativity within R&D departments. Drawing on Amar Bhide's work in *On the Origin and Evolution of Business*, the economics professor noted that 72% of great business ideas come from workers, 20% from regular citizens and just 8% from formal R&D. And while R&D generates lots of ideas, many are not implemented due to an over-cautious approach to failure.

Looking back through history to 13th century China encountered by Marco Polo, Sala-i-Martin described a society that had developed technologies well in advance of those in Europe, with paper money, fireworks, water canals, and the printing press. Yet 800 years later, this once great empire had become a very poor nation, which seemed to have been bypassed by the renaissance, and scientific and industrial revolutions. "So what happened?" asked the professor. China centralized and monopolized knowledge,

focusing all talent through and towards the benefit of government, which was a massive disincentive for the generation of new ideas, he said.

For this reason, Sala-i-Martin expressed serious concerns about what he sees as today's centralization of knowledge in Europe via the EU's Bologna Process, which is aimed at achieving comparability in the standards and quality of higher education, but is diminishing competition between universities and contributing to a decline in the reputation of European universities: "Fifty years ago, all the best universities were in Europe. But today only the UK's Oxford and Cambridge are among the world's best, and none are from continental Europe." He also berated European politicians and policymakers for putting too much emphasis on R&D as a means to growing GDP, and also for focusing R&D spending on two areas – telecommunications and biomedicine. "Every city in Europe wants to be a new silicon valley, or to focus on green energy."

"72% OF GREAT BUSINESS IDEAS COME FROM WORKERS, 20% FROM REGULAR CITIZENS AND JUST 8% FROM FORMAL R&D."

As an example of the failure of business to innovate and to optimise ideas, the professor pointed to the IT and mobile phone company, Nokia. Ten years ago, a Nokia was the mobile phone of choice, and the company was a leading sector investor in R&D and also the world's number 5

R&D investor in all fields. "If you look at Nokia's patents, it shows they had enough innovative ideas to have developed the iPhone, but failed to implement them," said Sala-i-Martin. This eventually led to the sale of its mobile devices business to Microsoft, by which time 98% of the company's value had been lost.

Success through innovation is not limited to businesses at technology's leading edge, the professor noted. The clothing giant, Zara, the circus company, Cirque de Soleil, furniture company, IKEA, and the global coffee shop operator, Starbucks, are great examples of old, traditional businesses reinvigorated by people with innovative ideas and new ways to attract customers, adding: "No scientists were involved in generating these innovative ideas. They did not come from R&D. They came from a shirt salesman, a clown, a student, and

PROFESSOR XAVIER SALA-I-MARTIN
Chief Economist & Senior Director,
 WORLD ECONOMIC FORUM



from teachers and poets." Sala-i-Martin also highlighted Facebook, commenting that this success story was the result of students taking an idea and running with it rather than the output from a company's R&D division. The key to staying competitive, the professor said, is having ideas and implementing them.

A major challenge facing Europe is the lack of a single market and excessive regulation, the professor suggested. The EU has a multiplicity of tax regimes, infrastructures, markets, and labor rules, among other diversities. "Go to the US, you need to buy one phone. In Europe, you need 27 different phones, or pay roaming fees, 27 lawyers, 27 accountants, 27 insurance companies. Europe also relies too heavily on banking to finance innovative projects, but the banks are risk-averse."

Returning to education, within both national education systems and companies, the professor argued for a major overhaul in approach because there is a widespread tendency to kill natural curiosity and to suppress the asking of questions which generates answers and solutions.

"Schools haven't really changed in over 200 years. Go into a classroom, and you'll see the same desks, the same chairs, maybe even the same teachers!" But the way digital-age children learn and interact today is about connectivity, rather than the regimented systems of book learning familiar to their parents. Fostering learning and curiosity requires the application of new technology. He also attacked the hyper-specialization that is encouraged by education – at school, in universities, in the work place. In his own field, economics, he suggested that today's innovations

are coming from outside the discipline. There may also be an over-emphasis on science and technology in education and not enough focus on art, which relies on observation to see things as they really are or how they work.

Some of the best ideas in business don't come from R&D, but from talking and exchanging ideas – the water cooler effect, or the Medici effect – where the meeting of diversity generates innovation, said Sala-i-Martin. For this reason, some companies are creating their own universities for inter-disciplinary idea generation, or having innovation days, sometimes with external input. Finally, innovation relies on experimentation, which inevitably results in some failures. But trying and failing is a key to understanding and innovation, the professor argued. "We need to say: Learn from failure. Embrace innovation!"

QUESTIONS & ANSWERS SESSION



NADINE DEREZA, PROFESSOR XAVIER SALA-I-MARTIN, DANIELE FERRARI, GRAHAM VAN'T HOFF



L leading the Q&A session, moderator Nadine Dereza asked the speakers for their views on the role of education in innovation.

GRAHAM VAN'T HOFF sees diversity as a key to innovation. "We need to attract people with new ideas. For Shell Chemicals, that means looking outside Shell, or outside the industry, or from inside Shell but outside the chemicals business." However, he accepted that people within Shell Chemicals also had good ideas, and suggested that the company also needs to bring in people with core competencies, such as chemistry and engineering, to protect its hydrocarbon assets.

"INDUSTRY NEEDS LESS GOVERNMENT INTERFERENCE AND MORE GOVERNMENT SUPPORT."

DANIELE FERRARI said that when he became head of Versalis the company lacked the drive for innovation. He agreed with Sala-i-Martin's contention that ideas are not only found through R&D efforts. "The answer is to go out and visit your plants, meet your people, or your partners and customers and create a culture open to ideas." He explained that he had given people his email and address and asked for their input. "After 3 days, my email inbox was full. But there were lots of good ideas, many from people working in our plants and in administration."

XAVIER SALA-I-MARTIN: Referring back to Cirque de Soleil, he said: "My message is: don't shut down R&D and hire clowns! Do R&D, but listen to others outside R&D too, and implement ideas."

NADINE DEREZA: "Google has Innovation Days. Could this industry do something similar?"

XAVIER SALA-I-MARTIN: "Parents should complement school education, for example, through using allowances as incentives. If my daughter can find problems and solve them, then she gets an allowance. It's a small-scale version of what happens in life. We have to innovate. Machines are eating up middle class jobs, and we're

seeing growing inequality between rich and poor, so to fill the gap people need to be creative."

NADINE DEREZA: "How are we going to switch more people onto STEM subjects and get them into the chemical sector?"

GRAHAM VAN'T HOFF: "We need better science education in primary schools and need people to understand that science is one of the foundations of society. People understand the contribution of pharmaceuticals but may not understand those of the chemical industry. We need to make science more interesting and we need to make the industry more interesting to attract the talent and innovators we need."

NADINE DEREZA: "What can government do to help boost competitiveness?"

DANIELE FERRARI: "We spend a lot of time trying to get government and politicians to understand our industry. We need to move them beyond a focus on plant-permitting and regulation and get them to understand the contribution we make to the economy. Right now, the bureaucratic burden is too high."

GRAHAM VAN'T HOFF: "We need to find new, better and faster ways to get our message across to governments to get their understanding and support."

XAVIER SALA-I-MARTIN: "I think the EU government does too much. It over-regulates, over-taxes, and over-intervenes. Industry needs less government interference and more government support. Government services are important, but they need to be more efficient."

NADINE DEREZA: "Finally, what would you all say are the priorities for competitiveness?"

GRAHAM VAN'T HOFF: "I think every company has to carve out its own basis for competitiveness, because we are all different. For Shell, it's about access to raw materials, finding options for value propositions, and focusing R&D in specific areas."

DANIELE FERRARI: "I agree with Graham. Look to compete on your natural strengths, and apply creativity."

EDUCATION WORKSHOP

WHEN AND WHY DO CHILDREN MAKE STEM CAREER CHOICES?

With

an eye to the promotion of Science, Technology, Engineering and Mathematics (STEM) in schools and higher education, EPCA organized this workshop with representatives from the Young EPCA Think Tank (YETT), the Belgian Foundation "Entreprise/Institut", academia, and Borealis, an EPCA member company. The workshop looked at what needs to be done to encourage more students to pursue STEM careers, and at what is already underway.

For several years now, EPCA has been promoting STEM to attract more talented girls and boys to join the chemicals industry, explained Wouter Bleukx, the EPCA YETT chair, and Business Unit Manager Vinyls, for Ineos Chlorvinyls. Introducing the workshop, he said EPCA had collaborated with Unesco and the European Schoolnet to produce two videos to promote the industry and careers in the sector, and to organize a students' workshop in 2011 and a teachers' workshop in Berlin in 2013.

In 2012 and 2013, EPCA also sponsored kids' marathons respectively in Budapest and in Berlin promoting STEM among children, their parents and teachers. EPCA has also invited XperiLAB.be® to its 2014 Annual Meeting in Vienna. This learning vehicle is designed to give children a chance to explore science and scientific methods first hand.

CLOSING THE STEM SKILLS GAP, INCREASING STEM ATTRACTIVENESS

Workshop chair, **Marc Durando**, executive director of European Schoolnet, started the session by pointing out that there are skill shortages in almost all science and technology jobs, including ICT (Information and Communications Technology). There are not enough mathematicians or physicists, and too few maths and physics teachers

"THERE ARE SKILL SHORTAGES
IN ALMOST ALL SCIENCE AND
TECHNOLOGY JOBS, INCLUDING ICT."

in many countries. The percentage of girls choosing STEM studies also remains far too low. To address these shortages, it will be necessary to increase the attractiveness of STEM studies in Europe, which will need new teaching approaches and better career prospects – compared to other sectors – and better communication about STEM careers. Making all these things happen will require significant and coordinated effort on the part of all stakeholders – from industry, from the education sector and from governments.

Durando said research suggested Europe currently needs an additional 850,000 STEM graduates and that the skill shortage



amounted to billions of euros in lost revenues. Furthermore, with an ageing workforce – where 20% of engineers are currently over 55 years old – the skills gap is likely to worsen if it is not addressed. If the situation is to change, Durando said, STEM teachers need to be better motivated and get more recognition. They also need new, improved teaching tools, more creative lesson content, and other resources. Industry must also play a more active role to ensure it is better engaged with education, to provide role models, to link with teachers, and to better explain the career prospects for STEM graduates.

WINNING HEARTS AND MINDS FOR STEM AT AN EARLY AGE

At the UK's University of York, the Centre for Industry Education Collaboration (CIEC) has been studying when and why children and young adults choose STEM careers. Director Joy Parvin told the workshop about the results of research in the UK, but suggested they reflected global issues relating to STEM recruitment. Although there has been a slight increase in 16-18 year olds choosing to study maths and sciences at Advanced Level, with the exception of maths at 11%, uptake for STEM subjects ranges from about 1% to 8%. However, the figures also show that apart from chemistry – where students are split equally between boys and girls – boys dominate among maths, physics and computing students. Sadly, few of the girls who choose chemistry go on to work in the industry.



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 Director of CIEC Promoting Science,
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MARC DURANDO Executive Director, EUROPEAN SCHOOLNET | **JOY PARVIN** Director of CIEC Promoting Science, UNIVERSITY OF YORK (UK) | **GERARD COBUT** Project Manager, XPERILAB.BE® | **LINA NEUNER** Chemistry Teacher, KLOSTERNEUBURG INTERNATIONAL SCHOOL | **EVA PFANZELTER** Senior Communications Specialist, BOREALIS POLYOLEFINE GMBH



LINA NEUNER, EVA PFANZELTER

Parvin said research into 9-14 year olds indicates that initial enthusiasm for STEM subjects is largely dissipated by age 14 as students find lessons uninspiring and disconnected with everyday life, although 45% still enjoyed the practical side of school science. The CIEC director said that while 52% of 9 year olds have a firm idea of what career they'd like to pursue, only 6% said becoming a scientist and of these 72% were boys.

Changing these trends will require much closer collaboration between schools and industry, Parvin said. Science-based industries need schools – teachers and students – to gain a much better understanding of what they do and the careers they offer. Better teacher training and resources and industry-focused and problem-solving lessons, complemented by site visits by students or school visits by industry ambassadors, create role models and a much more positive and attractive image of STEM industries in the minds of

children, she explained. Meeting women in science-based industry and jobs will also influence the career choices of girls.

XPERILAB.BE® – TAKING STEM TO THE STUDENTS AND COMMUNITIES

For the past four years, a specially designed truck – XperiLAB.be® – containing an experimental laboratory has been visiting local communities across Belgium and beyond to encourage 10-14 year olds to choose STEM subjects at senior school level. With official approval from all three ministries of education and support from Solvay (an EPCA member company) and other partners, XperiLAB.be® hosts about 450 groups and about 10,000 children a year. This October, it was parked up in Vienna beside the hotel where EPCA's annual meeting was held.

Gerard Cobut, the XperiLAB.be® project manager, says the science truck gives children the chance to carry out hands-on

experiments, arousing their curiosity and giving them a sense of discovery and the potential of science. "We're not teaching them with XperiLAB.be®. That's the job of teachers. But the students get a chance to feel what it's like to be a scientist, to wear a lab coat, to use a microscope, and attempt to solve real problems by experimentation," Cobut explained.

Staffed by two "explainers" and a driver, XperiLAB.be® enables children to engage with scientific methods – observing, following instructions, experimenting by doing or making [e.g. toothpaste, air vent rotors], testing hypotheses, and communicating results. "XperiLAB.be® is reliable, beautiful, attractive, and has great on-board IT. We're getting great feedback from the children and on our website, but it's too early to say whether students are choosing STEM careers as a result. But they are certainly leaving XperiLAB.be® happy!" said Cobut.



XPERILAB.BE® – HOW THE STUDENTS INTERACT: A TEACHER'S PERSPECTIVE

Middle and high school chemistry teacher, Lina Neuner, from Klosterneuburg International School in Austria, stressed the importance of XperiLAB.be® in giving children a chance to become familiar with the actual business of doing science. She explained that different children and different groups of children took different approaches to the experiences on offer. For example, some younger children in the 10-11 year age range need more assistance or encouragement from XperiLAB.be® support staff, while older children tend to be more confident.

She said the children have no difficulty following step-by-step approaches to the challenges they face, but sometimes do not read instructions carefully enough and improvise. Some children were discouraged by failure, but others were keen to learn from mistakes or lack of success and to try again – which is an important, positive

“SCIENCE-BASED INDUSTRIES NEED SCHOOLS – TEACHERS AND STUDENTS – TO GAIN A MUCH BETTER UNDERSTANDING OF WHAT THEY DO AND THE CAREERS THEY OFFER.”

lesson for science. Neuner praised the opportunity for children to practice manual skills – such as transferring liquids using pipettes, fine-tuning microscopes, or cutting, shaping or mixing materials. She recalled watching children experimenting with different shaped paper blades in an effort to get a solar-powered air vent rotor to spin at speed, noting how they tried different weights, delighting in coincidences, and seeing one group use leaf-shaped rotor blades to meet the challenge.

The teacher did not see big differences in the way boys and girls interacted in the mobile lab. Rather, she suggested that a student's relationship with science is personal, noting that XperiLAB.be® gives children the opportunity to demonstrate patience, concentration and logic, and to see connections.

BOREALIS – HOW ONE COMPANY IS PROMOTING STEM AND CHEMISTRY TO STUDENTS

Eva Pfanzelter, senior communications specialist with Borealis Polyolefine GmbH, offered some insights into how the Borealis Group – which produces polyolefins, base chemicals and fertilizers – is working in Austria and beyond to attract talented students into the industry and into the company. She explained how Borealis is doing this by promoting the chemical industry, its products and opportunities in partnership with associated institutions – like EPCA – and by communicating the group's own brand values as an employer and chemicals producer.

In Austria, Borealis has a range of educational sponsorships – with the International Kindergarten and Linz International School,

promoting plastics engineering and catalyst research at Johannes Kepler University in Linz, and donating materials and other resources for use in chemistry labs. On a wider stage, Borealis awards scholarships for PhD and master theses at several universities across Europe, and has a special student innovation award – Borstar – for doctoral and master degrees, which is worth €5,000 and attracts hundreds of applicants.

The company is also partner of the Young Polymer Scientist programme, a summer school for 17-year old students, including 12 lectures at Linz university and 4 weeks summer traineeships at Borealis.

Another innovative Borealis initiative is Power Girls, which is a one-day workshop for 12-year old girls, giving them the opportunity to visit the company and undertake different experiments. “Our hope is that Power Girls will help participants to develop an emotional and intellectual attraction for a career in the STEM sector,” says Pfanzelter.

Borealis also participates in two other initiatives promoting STEM careers and industry understanding. Lange Nacht der Forschung (Long Night of Research), is organized by two government ministries, and involves a number of institutions, museums and companies interacting with the public to encourage children and parents to learn about the industry and apprenticeships and other job opportunities. Borealis is also one of the three main sponsors of the Zoom Kindermuseum in Vienna, which is a 2015 exhibition focused on fostering interest in chemistry and plastics by making them more accessible to children and raising awareness of responsible resource use.

DIVERSITY WORKSHOP

“DIVERSITY MATTERS”

EPCA president Tom Crotty welcomed delegates to this first diversity workshop, reflecting on the fact that two years before the annual meeting had decided to focus on talent and technology in the industry.



“We rejoice in our talented people. But are we making the most of that talent?” Crotty questioned. “Do we maximize the diversity of talent available?” He suggested the issue was not about quotas, or political correctness, but simply one of good business. A quick survey of EPCA member companies showed that just 3% had a female chief executive officer, with associate members doing better with 35%. Registrations for the annual meeting indicated that 86% of delegates were male. However, Crotty noted that men were in the minority of workshop attendees.

Session moderator Nadine Dereza noted that the industry has struggled to attract

women, but reminded the workshop that diversity was a broader issue than gender. However, she suggested that time would restrict the opportunity to discuss some of the wider issues.

Before introducing the three speakers, Dereza voiced the hope that the workshop would encourage companies to embed diversity into their corporate committees, policies and structures, and that the industry’s 3rd generation leadership would foster diversity as an avenue for innovation and to deliver on sustainability targets. In her experience, companies embracing diversity were not only the best places to work but also the most profitable. She also reminded the workshop that Madeleine Albright, the

first ever female US Secretary of State, once said: “There’s a special place in hell for those women who don’t help other women.” Dereza then recounted how, in a recent project, London’s Heathrow Airport had altered its shift rotations and outreached to successfully recruit more women for security operations.

INNOVATION AND COLLABORATION FOR SUSTAINABILITY THROUGH 3RD GENERATION MANAGEMENT: AN URGENT CALL FOR DIVERSITY.

Opening his presentation, Marc Buelens, Emeritus Professor in Management, People & Organization, Vlerick Business School, reminded the workshop of Amar Bhide’s



PROFESSOR MARC BUELENS

*Emeritus Professor in Management, People & Organization,
VLERICK BUSINESS SCHOOL*

research that shows 82% of innovative business ideas come from sources outside formal R&D. “That tells you a lot about the need for and value of diversity,” he said.

While we all want new ideas, many chemical industry managers are “Triple A” – abstract, analytical and aloof – Buelens commented. But a look at the innovators mentioned earlier in the day by Professor Xavier Sala-i-Martin indicates that they are not “Triple A” people, rather they are hands-on, engaged and creative. He urged companies to seek optimal workforce diversity, suggesting those lacking internal diversity would struggle to cope with external diversity in the world at large and in their customer bases.

Buelens also reminded attendees of the thoughts of Sumatra Ghosal, which suggest 3rd generation strategies cannot be managed by 2nd generation organizations, and 1st generation managers. However, the professor suggested too many companies still employ 1st generation management techniques, which is ‘my way or the highway’, and ‘mushroom management’, which means keeping people in the dark, throwing crap on them, then chopping them off at the neck when they raise their heads. “3rd generation managers strategists – that’s what you should be after,” he said. “They use collaborative networks to generate new ideas and innovations to achieve

sustainability.” Companies need to be open, listening and connected!

Moving to his conclusion, Buelens said inclusive strategies require inclusive leaders, who can inspire questioning – asking “Why?” These leaders also need to be role models who act as mentors and coaches, especially for minorities. Leaders need to

“THERE IS A CLEAR BUSINESS CASE FOR DEVELOPING DIVERSE LEADERSHIP.”

think about and demonstrate the value of collaboration, and work to remove boundaries while promoting cultures of openness in all aspects of business. “Remember: you cannot manage 3rd generation strategies with 2nd generation organizations and 1st generation managers. Misalignment will be costlier than ever!”

**FIX THE WORKPLACE,
NOT THE WOMEN**

“Women are a critical part of global talent, and the chemical industry should

be working harder to advance, recruit and retain women in its workforce,” Deborah Gillis told the workshop. Gillis is President and Chief Executive Officer of Catalyst, the leading research and advisory organization working to change workplaces and improve lives by advancing women into business leadership.

Better gender diversity starts at the top of companies, she said, with senior leadership commitment, and requires good communication, making diversity part of the organizational culture, making a business case for diversity, engaging employees and setting goals and accountabilities.

Why are so few women in STEM industries and why are they likely to leave? Gillis said there are few same-gender role models – female supervisors or female senior executives – and women are often unaware of the attributes needed to get a promotion, all of which impede advancement. “You can’t be what you can’t see!”

Gillis said there is a clear business case for developing diverse leadership. Companies with a commitment to diversity are achieving enhanced financial performance, by leveraging talent to raise performance and innovation. They are also companies that reflect the diversity of

“MAKING CHANGES IN THE CHEMICALS INDUSTRY TO ENCOURAGE DIVERSITY IS A MATTER OF IMPORTANCE AND URGENCY”



ANDREW KRIS
Founding Partner,
 BORDERLESS

their marketplaces, which in turn helps to build and strengthen their corporate reputations.

One key route to greater gender diversity is through sponsorship, which the Catalyst President described as “A winning Trifecta.” Sponsorship is important for women’s advancement, and benefits both those individuals who develop talent and organizations, which will have more committed, satisfied leaders. Whereas a mentor will listen and speak to you, a sponsor will speak about you, for you and on your behalf, Gillis said.

By way of best practices, Gillis suggested companies wanting to promote gender diversity could look at initiatives developed by other businesses. She highlighted Kimberly Clark’s Unleash Your Power: Strengthening the Business With Women Leaders, Coca-Cola’s Global Women’s Initiative: Women as the Real Drivers of the 21st Century, Enbridge’s FEMINEM Employee Resource Group, and IBM’s Women’s Diversity Network Group. Concluding, the Catalyst CEO said gender diversity has to be intentional, and requires empowerment, encouragement,

achievement, and opportunity. “Focus on getting a strategy in place and remember that there is competitive advantage in recruiting the very best talent.”

DIVERSITY MATTERS! IT’S IMPORTANT AND URGENT!

Making changes in the chemicals industry to encourage diversity is a matter of importance and urgency, Andrew Kris told the workshop. A founding partner of Borderless, an HR specialist for the chemicals and life science sectors, Kris said today 50% of the workforce should be women, but they only represented 30% of staff.

Kris, who had a long previous career with Dow Chemical, said that developing demographics highlighted the need for greater gender diversity, because there aren’t enough men with the knowledge and experience to fill the industry’s future skills and talent gap.

Senior managers in companies needed to stop trying to recruit PLUs – People Like Us – Kris insisted. The tendency is for top managers to look for people from

the same sector, who know the business, who speak the same language, and who share a similar educational background or culture: “People who look like me, sound like me, and dress like me, etc.”

Companies need to forget comfort and embrace discomfort if they want to recruit the talent to make them innovative and sustainable, Kris continued. This means bringing in people who are different, who come from other industries, with different cultures, backgrounds, religions, ethnicity. It also means looking to different generations, and finding people with different and wide-ranging experiences.

The ‘PLU syndrome’ is a big problem, and the industry has to change, the Borderless partner said. It is ironic, he noted, that a sector willing to take massive and long-term financial risks when investing in assets seems very risk-averse when it comes to diversity. “Be bold. Take risks!” he urged. Take note of ‘good counsel’, which says diversity is an investment strategy, make sure it’s built into recruitment, invest the time of senior people, and look for and develop role models.



QUESTIONS & ANSWERS SESSION

“OUR FIRST
DIVERSITY
WORKSHOP”



Opening the session, Nadine Dereza asked EPCA president, Tom Crotty, what he thought were the biggest take-aways from the presentations.

TOM CROTTY: “If we’re really serious about diversity, then it has to be an active process. We can’t come back here in 10 years time and be asking: “Why has nothing changed?” We have to do something positive. We have to have workplaces that are designed to ensure diversity occurs.”

NADINE DEREZA: “Given the moral case and the business case – the bottom line – and the statistics that support the argument for diversity, does this mean that EPCA should perhaps put in place a Diversity Council to lead change?”

TOM CROTTY: “Yes. I’d like this – our first Diversity Workshop – to be the beginning of a process to see how EPCA can bring people together and start an active process.”

NADINE DEREZA: “Deborah, what do formalized diversity processes and committees allow people to do in your experience?”

DEBORAH GILLIS: “It’s like anything else. What gets measured gets done. Councils and processes need CEO engagement to gain attention and for visibility. Diversity is a business strategy. We put structures, goals, measures around every other business strategy, so we should do it with diversity.”

NADINE DEREZA: “Now Andrew, you’ve said that businesses need to reflect the diversity of the people they sell to. But how hard is it for you to sell diversity of recruitment to your clients in the chemical industry, particularly when it comes to senior grades?”

ANDREW KRIS: “I must say in recent years there has been improvement. Recently, I did some work with a petrochemical company whose executive committee was composed largely of white British men. The plea was: Can we have some non-Brits here, please?”

NADINE DEREZA: “You mean less male, pale and stale?”

“I REALLY BELIEVE COMPANIES CAN INFLUENCE SOCIETAL VALUES. IT’S ABOUT HOW YOU LOOK AND HOW YOU ACT AND WHAT YOU DO INSIDE YOUR COMPANIES.”



NADINE DEREZA, ANDREW KRIS, DEBORAH GILLIS, PROFESSOR MARC BUELENS, TOM CROTTY

QUESTIONS & ANSWERS SESSION

ANDREW KRIS: “Yes, but I – being somewhat more diplomatic – wouldn’t exactly say that. But the reality is that they wanted some diversity, some more continental and international men! However, some of our clients demand that we present them with a diverse slate of candidates, and will not accept our work is done until we do. Diversity has to be a deliberate strategy.”

NADINE DEREZA: “Marc, from your point of view, is this impacting students? Are they now thinking that regardless of where I fit in terms of diversity, there’s a job out there for me? Or do women still think they’ve already lost the battle before venturing into the job market?”

MARC BUELENS: “Unfortunately, change is very slow. If there are no clear policies to make diversity a reality, the situation is just stagnating. Discrimination in the workplace is much more entrenched than I thought and it will not be resolved without action and clear strategies, enlightened leaders, role models, structural changes.”

NADINE DEREZA: “Tom Crotty, I know the industry talks a lot about best practices across its operations, but where’s the best practice in diversity? Which companies are making the greatest strides?”

TOM CROTTY: “Well, I think it’s fair to point the finger at the chemical industry generally. Certainly from a gender point of view, we can’t claim to have made great progress. I can think of one example where there is a female CEO, and that’s DuPont, and Deborah has already talked about how important sponsorship was in making that happen. We’re doing better in diversity of people’s backgrounds, but we haven’t cracked the gender challenge.”

NADINE DEREZA: “Andrew, can you name some companies who are leading the way?”

ANDREW KRIS: “For confidentiality reasons, I can’t and won’t. But I can tell you there are some companies in the industry who are doing really well and promoting diversity panels and where leaders are engaged and making diversity a visible goal.”

NADINE DEREZA: “Deborah, while there are some companies in some countries making progress on diversity, there are some countries, such as Saudi Arabia where there are more women than men in higher education, but where their prospects look limited. What’s the wider picture? Can companies influence societal values?”

DEBORAH GILLIS: “Yes, I really believe companies can influence societal values. It’s about how you look and how you act and what you do inside your companies. A simple example is an ex-pat who went into Japan to run the company’s operation and discovered a policy that if you arrived really early in the morning, breakfast was provided, and if you stayed late, dinner was provided. If you stayed really late, then you got a ride home. Although that policy was well intentioned, what it did was reinforce norms that said work long hours, which, of



course, did not suit women. So the new CEO cancelled the policy. Initially it wasn't well received by some employees who thought a benefit was being withdrawn. But from the CEO's perspective it was the right thing to do to make the workplace more inclusive and to promote and include more women. That decision challenged societal norms.

"A SPONSOR WILL SPEAK ABOUT YOU, FOR YOU AND ON YOUR BEHALF."

It also said to the men: You don't need to be in the office all hours – go home and be an equal parent."

TOM CROTTY: "That's a good point. So many of our working practices reinforce norms that we need to challenge."

NADINE DEREZA: "What about the move away from home working, back into the workplace?"

DEBORAH GILLIS: "Well, it doesn't make any sense. We need to focus on what gets done not where it gets done. It's the same as companies trying to prevent young employees using social media. It's pointless. That's how they communicate and that's how we'll be doing business, connecting with one another."

MARC BUELENS: "Well, I know what happens when we insist people come in at 8 every Monday to Friday morning and leave at the same time every evening. More and more time is spent in meetings, meetings, and nothing gets done. Nowadays, young people want to communicate by Skype or other social media. The bigger question is about business values. I really hate the "work hard, play hard" mentality. I like the method for scaling Mount Everest: "Climb high, sleep low."

NADINE DEREZA: "Andrew, how flexible are employers becoming when it comes to working hours and conditions? Are they meeting the needs of employees or potential employees?"

ANDREW KRIS: "Some employers do get it. And they can sometimes manage flexible working. But they often tend to view it as an exception rather than endemic to the organization. But it has to come from the top."

NADINE DEREZA: "Is diversity a risk?"

ANDREW KRIS: "Let's go back to what I said earlier about the industry being prepared to risk hundreds of millions of dollars or euros on a plant, but not on a female employee who could potentially bring in hundreds of millions of dollars during her career. Yes, there's a risk. But the industry always takes risks."

DEBORAH GILLIS: "Andrew's right. Diversity is viewed as a risk. But we know that women tend to be promoted on the basis of past performance while men are more likely to be promoted on the basis of their perceived potential. Women have to prove they have done and can do a job, while men are promoted on potential. That's why sponsorship can be so important in giving women the same opportunities as men."

“YOU CAN’T HAVE A ROBUST RECOVERY IF ORDINARY CITIZENS DON’T HAVE MONEY TO SPEND.”

DAY 2: CLOSING LUNCH SESSION

CREATING SHARED PROSPERITY

TUESDAY 7 OCTOBER 2014



PROFESSOR JOSEPH E. STIGLITZ

Winner of the Nobel Memorial Prize (2001 Nobel Prize in Economics)
Professor, COLUMBIA UNIVERSITY
and Co-Chair of COLUMBIA UNIVERSITY’S COMMITTEE ON GLOBAL THOUGHT

In a hard-hitting speech, Joseph Stiglitz highlighted the threat growing inequality of wealth and opportunity poses to the prospects of a robust recovery in Europe and in North America. He also pinpointed European currency union – driven by politicians and poorly implemented, despite concerns raised by many economists – as a source of Europe’s current economic malaise.

“Something isn’t working the way it should,” Professor Stiglitz told EPCA. “It looks like Europe is entering a triple-dip recession. Today, wages are lower than before the economic crisis. The GDP of the eurozone is more than 15% below where it would have been had the 2008 financial crisis not occurred. Unemployment in the eurozone is 11.5%, and youth unemployment is almost 24%. Most European countries have per

capita GDP lower than pre-crisis levels. And the worst performing countries are in depression, with youth unemployment at 50% or above. What’s more, the performance of the best only looks good in comparison with the worst.”

“But how can this be?” Stiglitz asked. Because Europe’s resources – its human, physical, and natural capita – are much the same as they were before the crisis.”

Stiglitz took little comfort in the fact that America is doing marginally better. He noted that GDP is also some 15% below the trend line, and mid-range incomes are lower than a quarter of a century ago. Real wages are stagnating, despite continual increases in productivity. The US labor market remains weak, with high levels of disguised unemployment, and rising inequality has become a major concern, he said.

There are many dimensions to America’s rising inequality, the Nobel Laureate continued. “In America, the top 1% gets almost 25% of income, and has also received 95% of the gains since recession ‘officially’ ended.” He said it was no surprise that America has less equality of opportunity than ‘old Europe’ and less than other developed countries, because countries with high inequality of outcomes end up with limited equality of opportunity.

Stiglitz argued that rising inequality is a serious impediment to achieving a robust economic recovery and took aim at what he described as out-of-date, discredited economic theories. “The old view was that there was a trade-off between economic performance and equality – one could only get more equality by sacrificing economic performance. But the new view is that we pay a high price for inequality, and – when it reaches current extremes – inequality actually undermines economic performance.”

The old theory, which said everyone benefits from the growth of income at the top, was known as ‘trickle down economics.’ But Stiglitz said there never was a proper theory or any evidence to support it. In fact, current evidence is overwhelmingly contradictory. The old theory said most inequality results from differences in societal contributions, which Stiglitz paraphrased as “just deserts of the more able; they make a greater contribution to society.”

The new theory is that much of our inequality arises from “wealth appropriation,” where some individuals and groups simply take a larger slice of the national income pie, rather than making the pie bigger, which is what economists call ‘rent seeking.’ Stiglitz offered several examples of how these market distortions contribute to inequality, including “the natural resources curse,” the fight over who gets the benefits of oil and gas and other resources,



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COMMITTEE ON GLOBAL THOUGHT*



NADINE DEREZA
Moderator

and monopoly at the top of society, with exploitation/discrimination at the bottom. And in case anyone thinks this 'new theory' argument is the preserve of "liberal leftists," Stiglitz suggested they might check what the International Monetary Fund is saying. "There is almost no pushback to the new theory," he said. He also noted that among Forbes Magazine's listing of the 100 wealthiest individuals there are few real innovators, and none of those whose basic insights had led to the transformation of our economy – those who discovered DNA, the transistor, the laser, etc. He accused US banks of exploitation, market manipulation, and other practices that did not lead to faster economic growth, but did enable the sector to extract outsized returns. "Up to 40% of all corporate profits were going to the financial sector before the crisis," he pointed out.

"So why do more equal societies perform better?" said Stiglitz. It's because there is less scope for rent-seeking, and greater opportunity enables more individuals to realize their potential, he continued. "Less divided societies can pull together, and have more trust. There is wider support for needed public investments, and better macroeconomic performance." Lastly, said Stiglitz: "You can't have a robust recovery if ordinary citizens don't have money to spend."

There are policies that can promote growth and equality, the professor said. Some are obvious, such as more equal access to quality education. But others are not so obvious. For example, current monetary/macro policies are exacerbating inequality, which helps explain why so much of the gains since recovery have gone to the top, Stiglitz observed. He also suggested that better public transportation is a way to improve access to jobs.

The Columbia professor also took aim at the use of inappropriate metrics to gauge wealth, well-being and economic prosperity. GDP was a major target: "GDP can go up, even if most individuals in society are worse off. It's also an inadequate measure because it doesn't reflect other aspects of quality of life, such as improved or poorer health, longevity, increased insecurity or environmental degradation. That's why it's important to use metrics that go beyond GDP," said Stiglitz.

Wading into the failure of euro currency union, the professor said the EU was not an optimal currency area. Those responsible for its implementation had misdiagnosed what was needed to make it work: and it is not an easy matter to make a currency union with such diversity work. Significant problems arise, for instance, when countries borrow in currencies they don't control. He emphasized that the resulting crisis led to widespread fiscal problems, not the other way around. The EU failed to create institutions to enable the euro to work. There are fundamental problems in the structure of the euro – not the structure of the individual countries. Indeed, many of the structural reforms in individual countries are now making lack of demand – the real problem – worse.

Stiglitz argued that there is currently a global shortage of demand, and that the pursuit of flawed policy – in particular, austerity – had compounded the problem of the euro. Global demand imbalances have also grown worse, and these contribute to weak demand, as countries with deficits cut back faster than those with surpluses are expanding.

Furthermore, the global financial system is not recycling surpluses to where they are needed. Though some have pointed to a savings glut, Stiglitz questioned this. How

could one say that is a savings surplus, when there is such a huge global need for investment?

Another complicating factor has been the financial crisis: it made us lose focus, Stiglitz believes. "We became fixated on repairing the financial system and dealing with the immediate problem of the euro." But at the same time, long-term problems of inequality, global imbalances and the structural transformation needed to respond to the changing underlying fundamentals of the global economy – including changing global comparative advantage – were not addressed. In fact, some have become worse.

And the financial system is still not fixed. Meanwhile, the focus is on ensuring the financial system doesn't do harm through excessive risk taking and market manipulation, when the fundamental task should be ensuring that it performs the functions vital to a well-functioning economy.

Stiglitz offered a bleak prognosis. He sees the global economy muddling along, and Europe stagnating while the US achieves only weak growth, barely able to create enough jobs for the new entrants into the labor force. He also expects a slight slowdown in China, with knock-on effects in other emerging markets. And as global problems continue to fester, inequality will increase along with global imbalances. While some structural transformations are in progress, they are happening slowly, and loose monetary policies continue to feed asset price bubbles. Stiglitz urged the audience to learn the major lessons of the crisis: Sustained prosperity will be impossible without shared prosperity, but markets won't create shared prosperity on their own.

And even seemingly benign neglect can lead to matters getting worse!

SUPPLY CHAIN AND LOGISTICS LEADERS BREAKFAST

Welcoming participants, the session's chair Johan Devos, Bertschi AG's Group Sales Director, said the aim was to generate both discussion and ideas about how to improve supply chain and logistics performance across the industry. He explained that the session would begin with a brief presentation from

"WE ALSO NEED A NEUTRAL PLATFORM TO ORGANIZE COLLABORATION"

Jan Fransoo from DINALOG, focusing on collaboration opportunities, followed by round-table discussions and reports on five specific topics: Shale Gas; Global Trade and HSSE Standards; Collaboration/DINALOG; Global Trade and Intermodal; and Shipping. Workshop output will be used to guide future work planning by EPCA's Supply Chain and Logistics Committee.

Devos reminded the workshop of how much progress has been made through EPCA's Supply Chain and Logistics initiatives. These have produced around 20 important publications and led to the creation of working groups and their reports, all of which continue to push the boundaries of increasingly strategic supply chain and logistics activities. Devos said: "Already in 2014, the Talent & Technology workshop has highlighted the importance of bringing in new, creative people to complement skilled staff in designing and implementing supply chain and logistics innovations, to enhance industry competitiveness and sustainability."

TACTICAL COLLABORATION IN CHEMICAL SUPPLY CHAINS

Professor Jan Fransoo is Professor of Operations Management & Logistics, School of Industrial Engineering, Technische Universiteit Eindhoven & VP of DINALOG – the Dutch Institute for Advanced Logistics.

Jan Fransoo's main message to the European chemical industry was clear: to achieve competitive advantage and sustainability, pursue tactical collaboration, which requires a redefinition of product flows rather than simply sharing transportation.

To date, collaborative initiatives have focused on operational collaboration, the DINALOG vice president said. This is understandable, because it delivers relatively short-term, quick wins through working together. However, Fransoo feels that a lot of the low-hanging fruit in this area has been picked. And while strategic, structural collaboration is possible – through joint ventures, mergers and acquisitions – it requires major commitments to change.

For this reason, the time is right to pursue the many potential opportunities in the area of tactical collaboration, which involve forward planning and replacing material flows with information flows to add value to the supply chain, Fransoo continued.

DINALOG, the professor explained, is a public-private partnership focused on horizontal collaboration between producers and logistics service providers, and which is currently active in projects involving about 200 companies from several sectors. One of these projects is 4C4Chem, which is a partnership between several organizations – Technische Universiteit Eindhoven, SABIC Petrochemicals, Shell Chemical Europe

BV, Dow Europe GmbH, Den Hartogh Logistics BV, Cargogator BV, and VNCI – and which is aiming for a 5%-10% improvement in the current chemicals transport capacity utilization rates of 60%.

The project identified four key reasons for less than optimal capacity utilization: an imbalance between the location of production and consumption; empty returns; a short-term focus on optimization; and limited flexibility for carriers to plan shipments. While it cannot impact the first issue, 4C4Chem is addressing the others in three stages: Plan, Bundle, and Combine.

Plan involves improved forecasting and planning of transportation needs, and better short-term coordination between on-site and off-site logistics. Put simply, the aim is better alignment between shippers and carriers, by taking into account items such as end-to-end costs and turnaround times, and having transparency so trade-offs can be made in terms of investment costs in extra assets. The project has also developed a tool available to all partners to enable them to evaluate product swaps.

Bundle is focused on bundling barge transportation flows on the Rhine from the upstream chemical cluster to downstream users.

Combine is focused on minimizing flows of commodities by creating a virtual pipeline – based on the ARG ethylene pipeline model – by pooling production and inventories.

Fransoo said that achieving a 10% improvement in capacity utilization is a conservative target, but added that "While achieving this will take real commitment, it is definitely worth getting out of bed for!"



JOHAN DEVOS
EPCA Supply Chain Program Committee Chairman,
 SALES MANAGER BERTSCHI AG



PROFESSOR JAN FRANSOO
Professor of Operations Management & Logistics,
 SCHOOL OF INDUSTRIAL ENGINEERING,
 TECHNISCHE UNIVERSITEIT EINDHOVEN

ROUND-TABLE DISCUSSIONS

REPORTS:

TOPIC: COLLABORATION AND DINALOG

Do we agree that tactical collaboration is key for survival and that most other collaboration “low hanging fruit” has been picked up?
 How do we see the redefinition of information flows? How is this to be implemented? What are the required set of tools and skills? Are we prepared? If not, what is the time frame to get ready?
 What are the barriers against tactical collaboration, if any? How strong are these barriers and can they be overcome?

TABLE 4 | PATRICK MEERSMANS:

We had a lively discussion, as our table included procurement staff from the shippers and people from the Logistics Service Providers (LSPs). Our thoughts are that collaboration is not rocket science, but more about common sense. However, there

is an issue about information sharing and trust. We will always require some kind of intermediate organization or layer to start facilitating this, both in terms of IT systems and in terms of trust and transparency.

TABLE 7 | FRANK ANDREESEN:

Our table’s consensus was that having talked about collaboration for 15 years, there are still not many really great examples – DINALOG being an exception. We feel there is still resistance to collaboration. The further you go upstream in the chemical supply chain the more collaboration you have. The further you go downstream, and as you interface with many customers, the more difficult it gets. We also feel that while vertical collaboration is relatively simple, horizontal collaboration is much more challenging. So, it’s very important to implement the best practices we’ve mapped at so many conferences, and to make sure that we have the right levels of change management and leadership for collaboration, which relies so much on information sharing.

TABLE 9 | JEAN-CHRISTOPHE HERMAND:

Collaboration is not new, but we feel there is still a lot of low-hanging fruit that can be harvested and this is a good time to do it because we are greatly helped by new technologies and new thinking –

particularly the smart phone and related technology for organizing communications. But implementing new technology and new ideas requires management of change and a new culture. We also need a neutral platform to organize collaboration.

TOPIC: SHALE GAS

- What is the likely impact of shale gas in terms of logistics and existing supply chains?
- Do the regions which import shale gas have sufficient infrastructure to receive it?
- How will this intercontinental/land transport be organized?
- Are there specific HSSE items to take into account?
- Are we ready for imports/transport of shale gas? If not, what is the time frame?

TABLE 1 | PAUL GOOCH:

They say 10 days is a long time in politics. Well, two days is a long time in shale gas! Our table decided that products will flow, but this is not a simple picture: it’s not going to be all LNG(*) or all polyethylene. It’s not going to happen overnight as there are a lot of serious issues about infrastructure in the US: \$140bn of announced investment is not going to happen overnight, and there will be serious engineering capacity restraints. Who will be the enablers – the players that will make this product flow happen? That’s

“IS SHALE GAS A SHORT-, MEDIUM- OR LONG-TERM PROPOSITION?”



PAUL GOOCH
Managing Director,
THE LOGICAL GROUP

ROUND-TABLE DISCUSSIONS

a critical question. There are two players who have already announced they have the scale and muscle to deliver and build the capacity and receiving facilities. But they may be subject to the implementation restraints that we’ll see in the US. Looking at the demographics and the economics of Europe, we see a stable, ageing population, which is unlikely to increase demand, and we also have low or no growth and recession, which make life difficult. However, shale could be the trigger for some new capacity in downstream units in the future. There is also a view that shale gas may even save some European crackers and refineries because they are flexible, and have a wider slate of products being generated.

(*) Liquefied natural gas

TABLE 2 | ANTHONY ELWINE:

Our feeling is that there’s a lot of confidentiality about what’s going to happen with shale, and a lot of questions to be answered. We really need to have more information about tariffs, legislation and shipping. And what about longevity? Is shale gas a short-, medium- or long-term

proposition? Who’s going to make the investments – producers, Logistics Service Providers (LSPs), partnerships? What will happen in Europe regarding investment in shale gas receiving facilities? Will there be regional exploitation of reserves? Will there be arbitrage? Will we see smaller players exiting the market, and less competition? If there are fewer players, will we see collaboration becoming even more relevant? We need much more information to understand what is likely to happen.

TOPIC: GLOBAL TRADE AND HSSE STANDARDS

- Do we agree there is a need for global HSSE(*) standards in SC implementation and what should be done to achieve this implementation of Responsible Care in Europe and elsewhere?
- How do we overcome subsidiarity obstacles (freedom of nation states to deal with details of implementation of legislation) in this context?

(*) Health, Safety, Security and Environment

TABLE 3 | KEES VAN SEVENTER:

We talked a lot about HSSE standards and differences in them. Our conclusion was that companies should take the lead in trying to harmonize these and encourage institutions, such as CDI, to facilitate this process worldwide. There are cost elements, which we can’t hide,

especially with regard to local competition. This could be a serious issue, but we need governments to pick this up.

TOPIC: GLOBAL TRADE AND INTERMODAL

- What remains to be done to make transcontinental and European intermodal really work?
- What is the role of equipment standards and infrastructure in this connection?
- How is Europe placed compared to the rest of the world?
- What is the effect of the subsidiarity principle?

TABLE 5 | ROMUALD DE HAUT DE SIGY:

We started by talking about the rigidity and lack of flexibility in the system, and issues to do with port facilities. We also talked about the trade-off between passengers and cargo over waiting times, and about barriers in the system – how to collaborate across intermodal providers, how to cope with disruptive natural events, and human events, like strikes. We also see some stand-out issues around standards, particularly 60-foot, when lots of us are working in 40-foot. Another key issue is rail regulation and lack of standardization across the EU.

**TABLE 8 | PETER MARSHALL:**

Our table feels that in Europe today we have a pretty well-established intermodal operation, with a pretty dense network that functions quite well, although it can always be improved. We contrasted that with the US, where intermodal is underdeveloped. But how do we connect up today's network more globally, particularly regarding flows from the Middle East and elsewhere? In the ports we need more multimodal terminals, and IT infrastructure for tracing and tracking, etc. We also looked at what is a very interesting topic: the relationship between shippers and their customers, in terms of changing daily or weekly flows, and how these impact LSP capacity utilization. We looked at whether it's possible to work together to iron out inefficiencies, although we acknowledged this was moving into a tricky commercial space.

TOPIC: SHIPPING

- Global trade and ocean port & hinterland connections
- Are chemical regions ready for increased exports / imports?
- What is the impact of infrastructure? What is to be done to improve it? By whom?
- Impact of new regulation on low sulphur gasoil /diesel on marine transportation?

TABLE 6 | DR. ANGELA STIEGLITZ:

Our discussion focused on trade and infrastructure, and we had a good combination of shippers, LSPs and port representatives. There are ample examples of infrastructure bottlenecks, such as truck driver shortages in the US, or congestion

“OUR THOUGHTS ARE THAT COLLABORATION IS NOT ROCKET SCIENCE, BUT MORE ABOUT COMMON SENSE.”

in European and Asian ports. There are capacity issues at ports and with hinterland equipment, facilities, personnel, etc. It's a broad topic. In the next 30 years, transport demand is set to double, which means a significant challenge. Will we be able to cope? New ports are being built, but there is also a need to upgrading existing facilities. There are big issues of timing given the long lead times on infrastructure investment, even if the political will exists. There are issues between the private and public sector, and there are broader political issues to be addressed. Companies can address some of the short-term issues through investment and collaboration, but we need to work across industry sectors, and across governments.

SUGGESTED FUTURE SC/LOGISTICS TOPICS FOR EPCA TO ADDRESS IN THE NEXT 3 TO 5 YEARS:

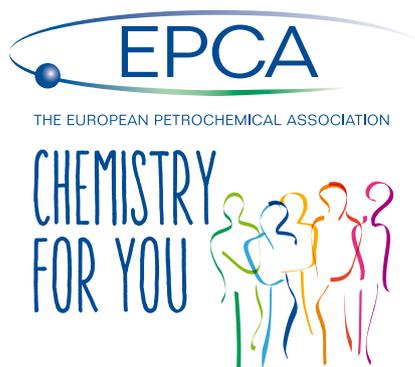
- Review progress made against the work of previous EPCA think tanks and workshops. How are we doing? What progress is being made? Where are the gaps and what are the barriers?
- What's changing in European supply chains and logistics as a result of changes in global flows?
- Where are we on European infrastructure?
- Can we better synchronise delivery from the shipper with when the customer needs to receive the material, to improve space/time performance?
- Look at practices outside chemicals sector – perhaps automotive – and look at technological breakthroughs and developments, such as driverless trucks.
- Intermodal technology: what's needed to make the system work better?
- Look at connectivity tools to iron out problems in the intermodal system.
- Look at intermodal capability development, especially from the perspective of extending collaboration outside of Europe to develop global trade.
- Better coordination and collaboration for activities between EPCA, CEFIC, ECTA and the many other associations in Europe.
- Responsible Care®(*): 5 years after the introduction, it is time to examine progress.

(*) Responsible Care® is the global chemical industry's unique initiative to improve health, environmental performance and security, and to communicate with stakeholders about products and processes.



GLOBAL COMPETITIVENESS AND THE CHEMICAL INDUSTRY : WHAT ABOUT EUROPE?

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EPCA provides platforms to **meet, exchange ideas, transfer learning**, and serves as a **think tank** for its members and its stakeholders.

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