

RAFAEL CAYUELA VALENCIA

## Technical convergence & technological collaboration at core of the third industrial revolution

Mr. Rafael Cayuela Valencia, the author of the book, *'Future of the Chemical Industry by 2050'* recently published by WILEY VCH, was in India to participate at the 'IGCW 2013' summit in December 2013.

Mr. Valencia is an economist by education, with 15 years of experience in the chemical industry. He is currently the European Commercial Director for Styrene Feedstock at STYRON. His expertise and interests span industry turnaround, long-term strategy, sustainability and business transformation and growth. He spoke to *Chemical Weekly* on a range of issues that will shape the future of the global chemical industry.

Excerpts from the interview:

### **Chemical Weekly: Could you please share your views on the chemical industry through next two decades?**

**Rafael Cayuela:** During the next decades the chemical industry will embark on a period of global growth and massive transformation, which will have the potential to almost triple again by 2035. In the next few decades, not only the major markets and players will change, but also feedstock, products and even the way companies innovate and interact with other suppliers, customers, governments and even society.

India and China will remain the fastest growing markets in the world, while China, Europe and North America will remain the largest chemical markets in the world. The need of our world to address climate change in one hand, and the need to move into cheaper energy and lighter feedstock, especially af-



ter the recent discoveries of shale gas in the USA, will gradually change the structure of the industry. The recent discovery of shale gas in the USA will put enormous pressure on the rest of the industry to develop similar feedstock economics.

Europe (short on energy and with non-competitive cost), China (with largest shale gas reserves in the world) and even Middle East (getting short of cheap gas) will follow in the next decades. The current technological and regulatory concerns will gradually disappear and lighter feedstock will become more available. On the other hand, the need to reduce emissions will create a tremendous business opportunity for companies that enable emissions and energy reductions. During this transformation, many industries and companies will blossom, while other might simply disappear.

### **How do you view the future economic trends globally and the impact on chemical industry?**

Despite the recent and long economic recession, the world will experience similar growth to the one observed during the last century. From 1930 to 1970 the world grew by an impressive 650%. From 1970 to 2010 the world also grew by an equally impressive 420%. From 2010 to 2050 and according to the consultancy firm Price Water-House Coopers the world is expected to grow by another 380%.

During the next decades, the world population will move from 6.8-bn people in 2010 to up to 9-bn to 10-bn people by 2050, while many people will be able to live well beyond 100 years. I know it might be difficult to see that at this time, especially as the world gradually gets out of the last symptoms from the last recession, but there are enormous support and factors for economic growth during the next decades.

However, growth will continue migrating from the advanced economies (Europe, USA, Canada and Japan) into BRIC and the rest of the world. At the same time, shale gas and positive demographics will have the potential to accelerate economic growth in the US. Indeed, the US will be the fastest growing economy among advanced economies.

### **What will be the major challenges for the industry to meet sustainability goals and yet remain competitive?**

The industry will keep its focus on globalization, with China, Europe, USA and India among its largest markets. However, the industry will start

gradually shifting its focus from operational efficiencies and commodity growth, into real innovation and technological convergence. Green chemistry will gradually become the norm in the advanced economies, while the emerging geographies will be forced to follow, especially as more and more global and stringent regulations will start to apply.

The need to globally reduce energy emissions and CO<sub>2</sub> emissions will present a significant cost for the industry, but more importantly a tremendous business opportunity. In a world poised to live with just 4,000 grams of CO<sub>2</sub> per capita per day by 2050, 15,000 grams of CO<sub>2</sub> per capita per day by 2025, from the current 28,000 grams in 2010; the chemical industry, technology and in-

novation are expected to have a formidable role. In that sense the need to reduce emissions and energy will present the single largest business opportunity in human history, up to 80 trillion USD by 2050. The chemical industry as a key enabler of sustainable solutions will be at the forefront.

### **What are the key growth challenges before the chemical industry and its preparedness to tackle them?**

First of all, companies, industries and nations need to realize the transformational times we are living in. The need to massively reduce emissions and energy will create a historical moment where technology disruptions and changes will not only occur more often, but also faster.

In that sense, the world will see a 'Third Industrial Revolution' – a more sustainable one. Under this scenario, the chemical industry as any other industry will need to start by ac-

knowledging the importance of this time and the gravity of the potential changes. The capacity of companies to think more strategically and to become more resilient, flexible and agile will become critical. Their survival and future success will be at stake. In an industry with massive assets and long-term approach, this task will not become easy. Especially after decades of massive growth and an industry focus on simple commodity growth and operational efficiencies, rather than innovation.

The inability to think strategically, innovate and adapt to the new world will be the major hurdle of any company, industry or nation.

***“The need to reduce emissions and energy will present the single largest business opportunity in human history, up to 80 trillion USD by 2050”***

### **How competitive is the European chemical industry at present and what are the road maps in place?**

The European chemical industry not just as the cradle of the chemical industry, but as the most efficient, sophisticated and most advanced industry in the world, is expected to have a leading role during the next decades.

During the last decade the chemical industry has been gradually shifting their focus and growth from the commodity into the specialty side and that process will continue. The recent development of shale gas in the USA will accelerate this process, while putting enormous pressure on the European petrochemical industry.

***“Companies able to master technological converge and collaboration will become the winners of the future”***

### **What are your views on future regulations and its impact on industry competitiveness?**

Regulation is poised to become more global, more efficient, focused, and more & more stringent. The need to address emissions and energy reductions is growing worldwide and will trigger more and more regulations. Regulators and governments will be forced to work around these boundaries, and the industry will need to learn to become proactive and support regulators on their good intentions. The companies and industries able to anticipate forthcoming regulations and to lead on these will become the winners of the future.

### **How do you view the future of specialty chemicals segment?**

Specialty segments will be at the forefront of innovation and the third industrial revolution. To a large extent, the chemical industry will need to migrate from a large and commodity focus into a specialty mindset and product offering.

### **How do you perceive business, technology and R&D models evolving to meet sustainability and market forces?**

Technical convergence and technological collaboration will be at the core of the third industrial revolution. Innovation will become the core of the chemical industry. The capacity to work across the whole value chain and to innovate across a large variety of technologies and industries will become the basis of innovation. For that purpose new business paradigms and regulatory frameworks will need

to be created. New skills and performance metrics will be required. Companies able to master technological converge and collaboration will become the winners of the future.