

## Editorial

## Megatrends – megascience? Part 3

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In the last two Editorials, I commented on how several megatrends influence science. Eleven out of the commonly cited 20 megatrends were discussed. This Editorial and the next one continue and finish the analysis for a set of megatrends.

12. Knowledge-based economy – Our educational standards increase throughout the disciplines, markets, professions, and more. Not only in the traditional economically strong countries such as the USA, Canada, Europe and Japan. Many countries keep that speed and may even become faster. China is maybe the best example for this. What we see these days on the soccer world championship happens as well on the global markets and global education. Emerging technologies which have success on the market typically are knowledge-based. The internet has revolutionized the speed and multitude in making information available. Markets and clients wishes have become faster, more dynamic, volatile. In chemistry we see at the horizon new manufacturing platforms – container plants which are flexible and modular. They allow a fast time-to-market, a faster break-even, better cash flow, and finally a faster depreciation of the costly plant. This makes controllers and financial managers happy and increases chances at the stock exchange. Finally, there are process-control optimized container platforms like Evonik's Evotrainer. Chemical production becomes training and, vice versa, training is a must for chemical production. Intelligent sensors, algorithms, process control loops, data mining and storage ... may change a bit the way we are scaling-up. Such process development happens all in the same intelligent environment. Laboratory and production site are compressed in the same 33 m<sup>2</sup>, typical for a container platform. Green and gold open access publishing make laboratories "transparent" and share the gained scientific knowledge in a Google-type manner. In future, we may have "Facebook"-type scientific forums in which the newest results – not older than 1 day – are discussed with colleagues – known and not known.
13. Business ecosystems – Companies need to become proactive in developing mutually beneficial

("symbiotic") relationships with customers, suppliers, and even competitors. Science is part of business. Journals like *Green Processing and Synthesis* and all others need to be sold. Publishing houses are business organizations. Thus, we as journal producers also need to deepen our level of our interaction with customers, suppliers, and even competitors. And we do. Not only at our classical forums such as exhibitions. Beyond that *Green Processing and Synthesis* has recently opened its LinkedIn page. Journals can even be found on Facebook. Why not? Their performance is part of the society. We know and like the individuals behind. We like to share what happens to the journal we feel associated to. Thus, journals fight for their "believers, followers, likers ..."

14. Changes in the work world – Science, chemistry and chemical engineering change in their work formats as do other employing environments. They are not isolated. Yet, chemistry still is a giant and a giant moves slowly, does not take the leadership in working adventures, and tends to be traditional. Thus, science and related applications are not the place for social innovations. Maybe the most visible change is that the "crazy egocentric scientist" of the 1950s changes to a smart, sensitive, team-playing scientific manager these days. The scientists of the Marvel Comics and of *James Bond* do not exist anymore. Yet, this is not in the public mind ... communication and public relations are still not the strength of science and chemistry.
15. New consumption patterns – Basically, anything what has been said above can be repeated here. The "giant chemistry" changes, but in a modest way. Decades ago clients demanded for materials, today they want services such as to have a protective coating; no matter what the material is. Functions and performances are in the centre of the desire. Fuels and energy are among the most dynamic markets and chemistry is involved here; new solutions at the horizon may foster big changes ... we are waiting for the photo-induced water cleavage to provide hydrogen, the photosynthesis of the "Stevia (sweetest sugar)" among the fuels.
16. Upheavals in energy and resources – Chemical production is a main consumer of energy and resources and will change with different supply-chain

management in these fields. Vice versa, new types of energy and resources may change the way we do chemistry. Suddenly we seriously discuss plasma and electrochemical ways for chemical production. For use within main-stream chemistries, not for the few niches they always have entered. Resources may not be “mined” anymore in the way it was done in the past. For the simple reason that resources start to be depleted. Germany is, for example, the largest platinum exporter to the USA in 2013 with a market share of 17%. Germany has no platinum in its soils. The noble metal is gained by massive recycling of exhaust gas catalyst in cars. Looping wins over one-directional, one-way uses.



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Next time we will finish this serial on mega-trend analysis towards science.