



Present World of Chemistry and its Impact on the Czech Industry



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Mini review

Even though the Czech Republic and its industry is a relatively small part of the global scene, we need to look at what is going on at a higher level. One must look at what is happening and why in order to get a picture of what might be happening in the future. So, in the following article I will apply both of my professions; international marketing applied to the chemical sector. Each global economic period is characterized by several main economic drivers. Each period lasts about 20 years. When the situation reaches the middle of a given period, the decline of that economic period has already begun. The one we are in started around 2010 [1].

What did it bring? Two of the main current economic global drivers are capital accumulation and concentration. On a global scale, this has fundamentally changed everything in chemistry. Large multinational chemical companies have merged or been acquired. There are still famous names of big European chemical companies, but they are subsidiaries of one multinational company [2].

The direct consequence is that none of the big names are competing today, but they have been assigned and directed what to do and what production to handle. This is also why, even if someone buys a long-established product from a reputable brand name, it is usually the product of a single multinational company with many plants and subsidiaries around the world that has decided which of its factories will continue to produce it. On the other hand, it is common for several reputable brands to sell a single product under different names, manufactured by a different company of this giant chemical group.

In addition, it is common practice for a reputable brand name that it has an established product on the market for years, to ask other independent smaller chemical manufacturers who have the appropriate technology, how much they will supply the product for. And the lowest bidder then produces the product and it goes to market under a reputable brand name and an established name for that market.

And it's even more complicated than that. A characteristic feature of global capitalism is that it transfers its production capacity to the countries where it makes the biggest profit. That is why most chemicals today are produced in India and China. The multinational companies, today in fact only one, have invested in the construction of modern chemical plants with high productivity and large production capacity in those countries. In Europe, only a small range of chemical products are made today, compared to 20-30 years ago. In terms of the range of products produced, this is about 15% of the former range of chemical products [3].

Moreover, because the EU Commission acts on the basis of an order and only the capital-rich are able to push the order through the EU administrative procedure, small chemical manufacturers have also been wiped out. Economic pressures have been created on small companies in the form of the REACH Act and its modifications, environmental and hygiene regulations, and other statutory regulations. These pressures have put such an economic burden on small companies that it no longer pays off for them to produce anything.

But there has also been a global redistribution of resources of important raw materials. After the government coup and secession of South Sudan, the intended pipeline through Ethiopia failed to be built. Due to Sudanese resistance, it could not be built along the Nile and through Egypt. And even if the coup in Libya was successful, the planned linking of pipelines from Libya to those from the Arabian Peninsula did not happen. Those were supposed to be linked to Iraq [4]. But Russia also does not want to submit to the dictatorship of the IMF. South American countries with oil and gas resources are only partially "tamed and subjugated", and it is difficult to know when they will break free. Put simply, many question marks are raised over the future of oil and gas. On one hand, this creates pressure to switch to electromobility, but the impact on the chemical industry is far greater. The vast majority of chemical raw materials are produced from oil and natural gas. Today, chemical products are becoming hard to get and sometimes

some are no longer available even at unrealistic prices [5]. But the game is even more complex. For several years now, China has been under pressure to privatize its banks, to back down on its claims to oil deposits in the China Sea and more. But China controls 80% of the world's mining and production of rare earth elements, which are essential for the production of semiconductors and batteries [6].

The "covid crisis" with its traffic problems has come into play also. Or rather, it was the result of a great international economic game. In which the construction of the new "Silk Road" has a role to play. This situation is causing increased pressure on electromobility. On one hand, it is clear to everyone that the automotive industry will undergo a fundamental change. But the hidden impacts are much more serious. Including the very low efficiency of energy use from the initial source to its final consumption in the car. Compared to internal combustion engines, about 6 times less [7].

One consequence is that much more electricity will need to be generated somewhere. If I consider Europe, there are not many more hydroelectric power plants that can be built. Thermal power plants have their limits in oil and declining coal production. Solar and wind power plants produce as much electricity over their lifetime as is roughly needed to produce and dispose of them [8]. People are resisting nuclear power. TOKAMAK is far from up and commercially running.

All the world's major car companies have built production plants in North African countries. They are supplemented by the production of parts and components, so not only is the automotive industry going through major fluctuations, but at the same time there is a shift of car production capacity and components from Europe to there [9]. China has also entered the game. And electromobility will mean the need for incomparably fewer parts and components.

The consumption of semiconductors, but especially batteries, will increase greatly. And that's a big problem for the future. Because they require some rare earth elements, such as dopants, which occur in trace amounts in the deposits [6]. So, their extraction, but especially their isolation (usually water processes) will become a major ecological disaster. There's another catch. There is only a very limited amount of these elements in the Earth's crust, so when they run out, it means the end of semiconductors. Current technologies cannot recover them from already produced and potentially recycled semiconductors and batteries.

Due to the oil situation, the construction of new chemical plants in the Arab world has been developing for several years. So that it is not far from the place of extraction to its processing into chemical raw materials, while at the same time reducing dependence on China. From this briefly outlined situation, some assumptions can be drawn for the development of the chemical industry in Europe and also in the Czech Republic. Commodity

prices will fluctuate and rise strongly. Moreover, some of them will be hard to get, or there will be occasionally available only. Until new polymer production starts in the Arab countries, fluctuations can be expected. Both in pricing and delivery dates. Here is an opportunity for greater use of biopolymers. Their technologies were brought to industrial scale in the 80s, but were unable to compete with petroleum-based polymers in terms of production costs.

Just as chemical production is being concentrated and redistributed globally, more and more efficient technologies are being built. But they are designed to provide large quantities of the most versatile product. The range of end-use chemical products can therefore be expected to narrow even further. And the ones that remain will be universal for a specific area. So, they will meet several possible target uses at the same time, but because it will be a compromise, all of them will be only partially met. This creates a window for small-scale production of specialties. But due to pressure from the giants, especially through EU legislation, small-scale chemical production in the EU has all but disappeared. And that's the gap in the market.

There are more than 1,400 companies in the Czech Republic that manufacture for the automotive industry [10]. The vast majority of them are facing extinction. Each of these companies uses chemical products in their production. These companies are already struggling due to the fluctuations in car production. But, in marketing terms, within 10 years no one will need their products, because production capacity will move elsewhere, where there is a higher profit margin, and at the same time due to the transition to electromobility. If these companies do not change their product range in advance, they will disappear.

The energy sector has a decent chance. Not only will more electricity need to be generated, but more importantly it will need to be transferred to users. Aluminum and its alloys will play an increasing role. But this concerns the Czech Republic only minimally, because the largest processing capacities are and will be in the vicinity of bauxite occurrence and processing, i.e., near aluminum plants. While there appears to be some opportunity in the construction of battery plants, these potential plants will be a foreign investment, will be dependent on Chinese raw material supplies and will have real environmental problems. However, there will be an increase in lithium (Li) consumption and there are decent supplies in the Czech Republic [11]. Also, other types of batteries that have been developed but are minimally or not produced should not be forgotten.

So, what is in store for us in terms of chemistry in general? Because we are subject to the period of global economic influences and simultaneously valid economic drivers, regardless of our will, we are already in the second half of its period. This means that the effect of these drivers is diminishing and something new is already under preparation. Therefore, the next years of this decade will be full of fluctuations and changes. But the "covid crisis" has also

pushed people towards internet trading, which has no limits and encompasses the whole world. That's why even if on one hand we get universal products from an essentially unknown manufacturer, but under a renowned multinational brand, we will always be able to find what we need somewhere in the world. But not only price, but also transport and distribution channels will play a key role.

References

1. Stuchlik Peter (2018) Corporate Marketing Management. VSFS Praha, Czechia.
2. Alexander H Tullo (2021) The chemical industry is recovering from the COVID-19 pandemic. C&EN's Global Top 50 chemical firms for 2021 99(27).
3. Czech Statistical Office: Czech Statistical Office | CZSO.
4. Vincent Oldenbroek: Hydrogen Trade Potential in African Pipeline Structure.
5. Stuchlik Peter (2019) Marketing Management of International Trade. VSFS Praha, Czechia.
6. World Economic Forum (2021) All the metals we mine each year, in one visualization, Oct 14, 2021, This is how much metal we mine every year | World Economic Forum (weforum.org)
7. Stuchlik Peter (2020) Corporate Marketing Management, VSFS Praha, Czechia.
8. Weather Guard (2023) Wind Turbine Costs: The Economics Of Wind Energy In 2023.
9. Dolapo Owoyokun (2023) Assessing the African Automotive Industry.
10. Resort of Justice Czech Republic: Justice CZ, Czechia.
11. European Metals (2023) Cinovec vertically integrated battery metals project.



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