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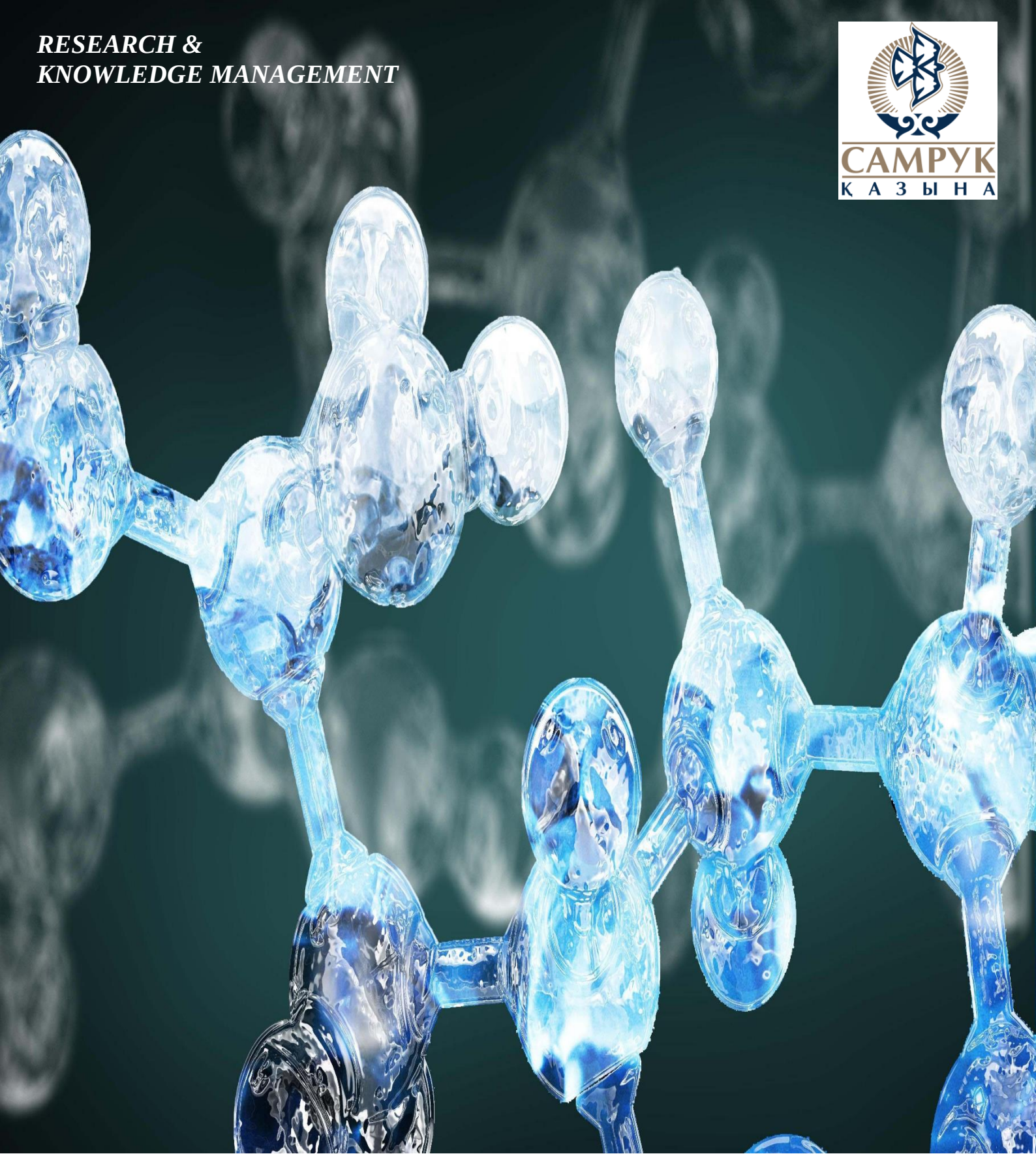

CHEMICAL INDUSTRY TRENDS

5 September 2016

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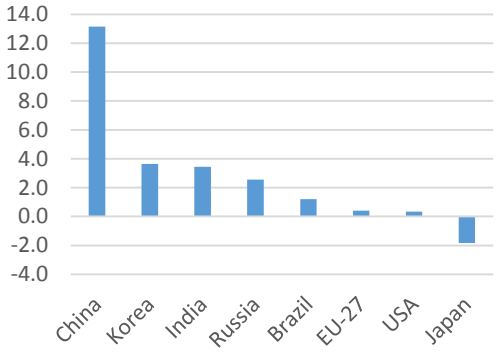
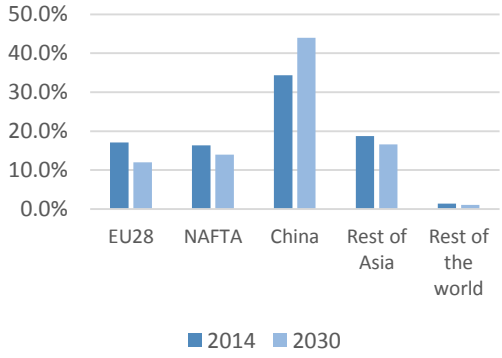
1. Key highlights

- Global chemical output (excluding pharmaceuticals)[1] grew by 3.6% in 2015 reaching USD3tln. Declining oil prices stimulated production by reducing prices of feedstock. However, production was hampered by poor economic performance across emerging countries (especially Russia and Brazil). China continues to be the driver of growth despite economic slowdown.
- By 2030, global chemicals sales are expected to reach EUR6.3tln, with pesticides and specialty polymers being the main drivers of growth. China's share of the global market will increase to EUR2.75tln or 44%, while the EU, North America, Japan and the rest of Asia are going to lose their relative share of the market despite growth in absolute terms.
- Key trends in the global chemical industry are:
    - Shift in global growth dynamics: Asia is the main driver of the chemical industry.
    - Demographics change: urbanization, population growth and growing living standards increase demand for high quality chemical products, foods, healthcare etc.
    - Increasing role of R&D: innovation lies at the heart of the chemical industry.
    - Globalization and consolidation of the chemical industry: chemical industry becomes more concentrated resulting in increased competition on the global market.
    - Shale gas and oil revolutionizing the chemicals market.
    - Green growth and strengthening regulation will require constant productivity growth.

Average annual production growth, 2004-2014



Share of the global chemical sales, 2014 vs 2030



Source: European Chemical Industry Council, Samruk Kazyna

- Kazakhstan remains a net importer of chemical products, with imports being much more diverse and having more value added.
- Kazakhstan's chemical industry has significant potential in some subsectors due to cheap feedstock and government support, but suffers from low demand from manufacturing industries, physical depreciation of fixed assets and infrastructure, technological backwardness and high costs per unit of output.
- Priority sectors for development in Kazakhstan include petrochemicals (polypropylene) and agrochemistry (fertilizers and herbicides)

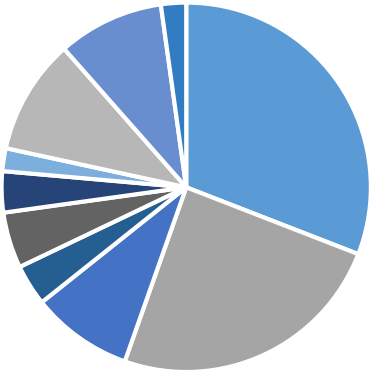
[1] The chemical industry produces more than 70,000 different products: polymers and plastics, especially polyethylene, polypropylene, polyvinyl chloride, polyethylene terephthalate, polystyrene and polycarbonate comprise about 80% of the industry's output worldwide.

2. Overview of the global chemical industry

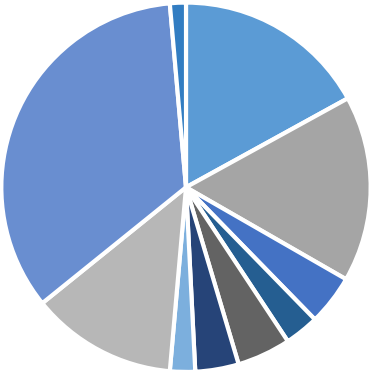
The chemical industry is essential to the global economy. While it is not the fastest growing sector, it has crucial importance for sustainable development of other industries (automotive, construction and agriculture), as well as for promoting innovation that is the modern driver of growth. Global competition in the chemical industry has severely increased in the last ten years, over which China replaced the EU as the largest player in the market, both in terms of supply and demand of chemical products. Consequently, the chemicals market in Asia became twice larger than that of the EU.

Global chemical output (excluding pharmaceuticals) grew by 3.6% in 2015 to USD3tln. Production was stimulated by the decline in oil prices, which significantly reduced the cost of feedstock and helped European chemical companies to catch up with North American competitors. However, chemical production was hampered by poor economic performance across emerging countries (especially Russia and Brazil), while the Chinese economy started showing signs of slowing down.

Share of the chemicals sales, 2004



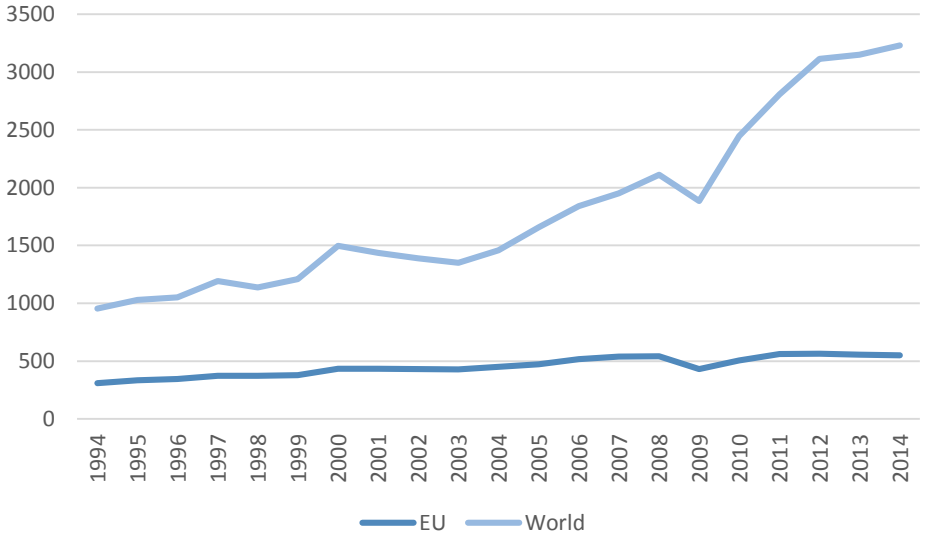
Share of the chemicals sales, 2014



Source: European Chemical Industry Council, Samruk Kazyna

World chemicals sales increased 2.2 times between 2004 and 2014. The European and North American chemical industries continue to drive the global chemical industry, with R&D being the main competitive advantage. Despite this, the EU contribution to global chemicals sales dropped almost twice to 17% in 2014 vs. 30.9% in 2004. Similarly, the NAFTA contribution also decreased to 16.3% in 2014 from 24.5% in 2004. In contrast, Chinese share of global chemicals sales increased from 9.3% in 2004 to 34.4% in 2014, making China the largest chemicals market in the world. In 2014, chemicals turnover in China increased by 10.3% to EUR1,111bln, exceeding sales value in the next six countries combined, and more than the EU and NAFTA markets put together.

Sales in the chemical industry, EUR bln (2004-2014)



Source: European Chemical Industry Council, Samruk Kazyna

Global chemicals turnover grew by 2.6% from EUR3,151bln in 2013 to EUR3,232bln in 2014. Sales growth was considerably lower compared to the 10-year trend, when average annual sales expanded by nearly 9% per year.

Dynamic of overall sales in the chemical industry (2004 vs 2014)

Country group	2004, EUR bln	2014, EUR bln	Share in 2004	Share 2014
EU (28)	451	551	30.9%	17.0%
NAFTA	357	528	24.5%	16.3%
Japan	129	142	8.9%	4.4%
Rest of Europe	53	98	3.6%	3.0%
Latin America	72	151	4.9%	4.7%
Korea	52	121	3.6%	3.8%
India	29	72	2.0%	2.2%
Rest of Asia	147	413	10.1%	12.8%
China	135	1,111	9.3%	34.4%
Rest of the World	32	44	2.2%	1.4%
World	1,458	3,232	100.0%	100.0%

Source: European Chemical Industry Council, Samruk Kazyna

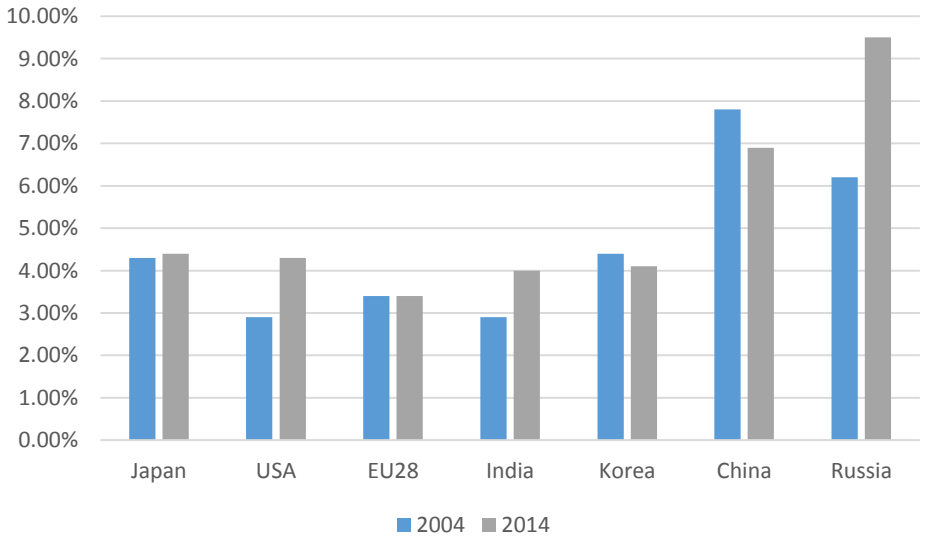
From 2004 to 2014, the chemical industry in the EU had an average production growth rate of 0.4%, mostly due to it being severely affected by the spill-over effects of the economic and financial crisis. Since then, the chemical sector has been recovering with strong performance in 2010 and early-2011. Nevertheless, after marginally topping pre-crisis levels in 2012, production started stagnating. Chemical output grew just 0.3% in 2015 compared to 2014. Chemical industry growth in the EU was slightly higher than in US, where growth averaged only 0.3% over 2004-2014. Chemicals production in Japan has been declining since 2007. Data shows Japanese production falling by 1.8% on average over the same period. On the other hand, production in China had 13.2% average annual growth, which is the highest

growth rate in Asia, in comparison to other emerging economies such as Korea (3.6%), India (3.4%), Russia (2.6%) and Brazil (1.2%).

Global chemicals market is very concentrated, since in 2014 30 largest chemical-producing countries had a combined turnover of EUR2,815bln or 87.1% of global sales. Top twelve European countries on the list had only 19.3% and top twelve Asian countries had 51.9% of the sales. Chemical industry is rapidly changing with China being the main driver of growth. Its ambitious industrial policy strategy within the next Five-Year Plan highlights Chinese petroleum and chemical industry, and, as in many other sectors, China is gradually planning to move from low value added industries into research-intensive high-tech chemical industries.

Another big player on the global chemicals market is oil-rich Saudi Arabia, which already started the first stage of the project Sadara, a joint project of Saudi Aramco and Dow Chemical, which unites 26 production lines with a total capacity of 2.7 million tons of chemical products. One of these plants, the Solution Polyethylene plant, has already begun production and shipped its first products to Singapore late last year. The USD20bln project is the world's largest chemical complex ever built in a single phase.

Capital expenditures by country, % of sales (2004 vs. 2014)



Source: European Chemical Industry Council, Samruk Kazyna

Capital investment is a key factor in securing the future development of the chemical industry. Major equipment or plant renewals require long-term planning. Such investments improve productivity and/or introduce new products, and are needed to comply with regulations or reduce operating costs. Capital spending intensity in Russia is far higher than in the rest of the world. Most major chemicals producing countries increased their chemicals spending intensity from 2004 to 2014 apart from three regions: China, South Korea and the European Union. The European Union continues to lag behind registering a constant decline during the past 11 years. Capital intensity is both an indicator of loss of attractiveness as well a driver of future competitiveness.

Products of the chemical industry can be divided into three groups:

- Base chemicals, also called commodity chemicals, include petrochemicals and their polymer derivatives along with basic inorganics. They are produced in large volumes and sold in the

chemical industry itself or as precursors to other industries, providing more than 50% of global chemicals sales.

- Specialty chemicals incorporate paints and inks, fertilizers and other crop protection, dyes and pigments, it is by far the most heterogeneous group in terms of products and applications.
- Consumer chemicals incorporate a very large number of products, which can be divided into two sub-groups: household products on one hand and industrial cleaning and disinfectants on the other hand.

Big industrial users constitute about two-thirds of the total demand for chemicals, while the remaining share of chemical products goes to different branches of economy such as agriculture, services and other business activities. In developing countries, the decomposition of demand is quite different, reflecting the structure of the economy.

3. Chemical industry in Kazakhstan

Overview

Chemical industry in Kazakhstan is a priority and diverse sector that provides raw materials and resources for many other industrial, agricultural and service sectors. The main advantages of the chemical sector in Kazakhstan include:

- significant reserves of energy, water and natural resources that form the basis for the development of the chemical sector,
- large and fast-growing domestic market, that is currently supplied by imports,
- extensive experience in production of several sub-groups of the chemical industry,
- stable macroeconomic environment,
- favorable background to attract foreign investment,
- geographical proximity to China and other fast-growing markets for chemicals.

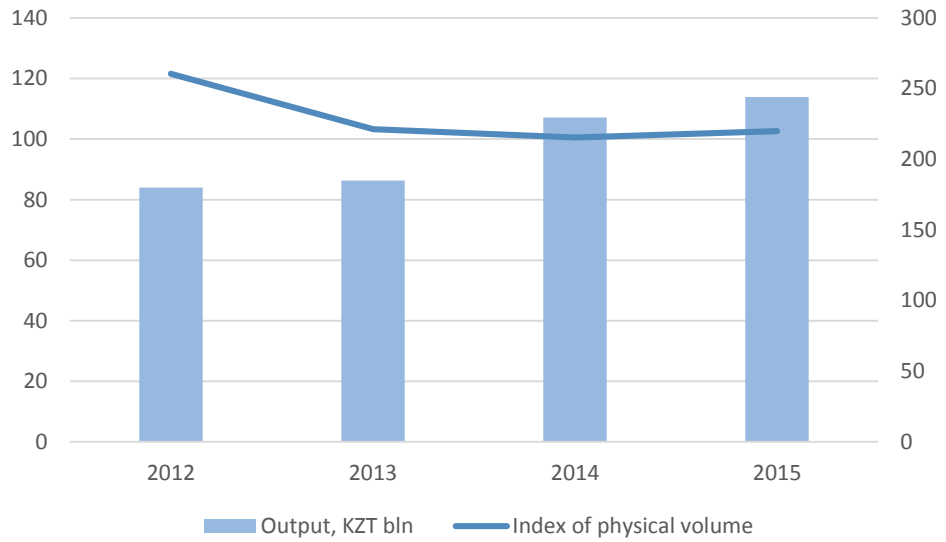
Large commodity stock, coupled with a significant demand both domestically and abroad, create a favorable framework for the development of the chemical industry in the short and long-term perspective. However, while Kazakhstan is abundant in mineral and hydrocarbon resources, including significant reserves of phosphate, chromite, sodium salts, the country suffers from several disadvantages. According to the Kazakhstan's Ministry for Investments and Development, chemical industry is using outdated equipment and technologies, which limit the ability to produce goods with high added value, such as specialized and consumer chemicals.

To resolve this issue, Kazakhstan has been stimulating investments in fixed assets to renovate production since 2010. One of the programs that were designed to give an impetus to the manufacturing in general and chemical industry in particular was the State Program for Accelerated Industrial Innovative Development (SPAIID) announced in 2010. Projects implemented under this program included: the modernization of the Pavlodar chemical plant in 2012 and Kazphosphate plant in 2013, reconstruction of the sulfuric acid production plant in Stepnogorsk in 2013, construction of the mineral fertilizer production plant in Aktobe region in 2014.

In 2015, the output of Kazakhstan's chemical industry has grown both in physical volume (2.6%) and in monetary terms (6.3%). Production volume in 2015 amounted to KZT244.1bln, primarily due to increased capacity utilization and the launch of new enterprises LLP Talas Investment Company (production of sodium cyanide), LLP JV Sulfuric Acid Plant-Kazatomprom (Sulfuric acid), LLP Color

International Technologies (paints and varnishes) and LLP Hlopkoprom-Cellulose (carboxymethylcellulose).

Output of the chemical industry (2012-2015)



Source: Ministry of National Economy, Committee on Statistics, Samruk Kazyna

Production of mineral fertilizers continued to increase over 2015: nitrogen fertilizers (9.9%), phosphorus fertilizers (9.8%). Increased production of chromium trioxide, chlorine and caustic soda due to introduction of new capacities leveled the drop in production of yellow phosphorus – one of the main export products of the chemical industry in Kazakhstan.

Production of selected chemical products (2012-2015)

Product	2012	2013	2014	2015	2015 to 2014, % change
Chromium trioxide, tons	25,163	23,216	19,784	22,278	112.6%
Chromium oxide, tons	29,234	30,914	32,954	30,153	91.5%
Chlorine, tons	15,100	18,800	19,543	22,269	113.9%
Caustic soda, tons	17,900	27,300	29,479	34,198	116.0%
Hydrochloric acid, tons	3,768	15,953	39,152	34,352	87.7%
Phosphorus, tons	86,920	90,164	100,139	84,534	84.4%
Sodium triphosphate, tons	57,488	50,153	40,198	20,317	50.5%
Sulphuric acid, kt	1,719	2,081	2,278	2,550	111.9%
Hydrofluoric acid, tons	9,028	8,961	8,577	4,461	52.0%
Nitrogen fertilizers, kt	165	188	283	311	109.9%
Phosphorous fertilizers, kt	70	72	82	90	109.8%
Polymer based paints and varnishes, kt	607	771	679	667	98.2%
Detergents, tons	3,801	6,020	6,739	5,361	79.6%

Source: Ministry of National Economy, Committee on Statistics, Samruk Kazyna

State support of the chemical industry allowed to renew existing and introduce new production equipment via both government and private investments. This will not only provide opportunities to

increase output to the domestic and foreign markets, but also to manufacture new products, which will affect adjacent sectors of the economy.

However, fundamental problems remain unsolved, Kazakh chemicals producers have several disadvantages:

- obsolete technological base,
- high operational and transportation costs,
- shortage of qualified personnel,
- low demand from other manufacturing sectors, such as machinery and automotive,
- lack of technology and equipment for production of high-end chemicals that are required by businesses and consumers,
- other factors that decrease overall competitiveness and profitability of the chemical industry.

External trade in chemicals

The main exports are petrochemical products (distillates, coke, bitumen, light oil) and basic inorganic chemical products (uranium, aluminum oxide, yellow phosphorus, sodium tripolyphosphate, thermal phosphoric acid, fertilizers, chromium salts), which occupy more than 96% in the export of chemical products Kazakhstan. Since light oil and other low processed products dominate export flows, for the purposes of this study and in accordance with the UN methodology, we are going to analyze the data on non-oil chemical products, groups 28-40 of the Harmonized Commodity Description and Coding System (HS).

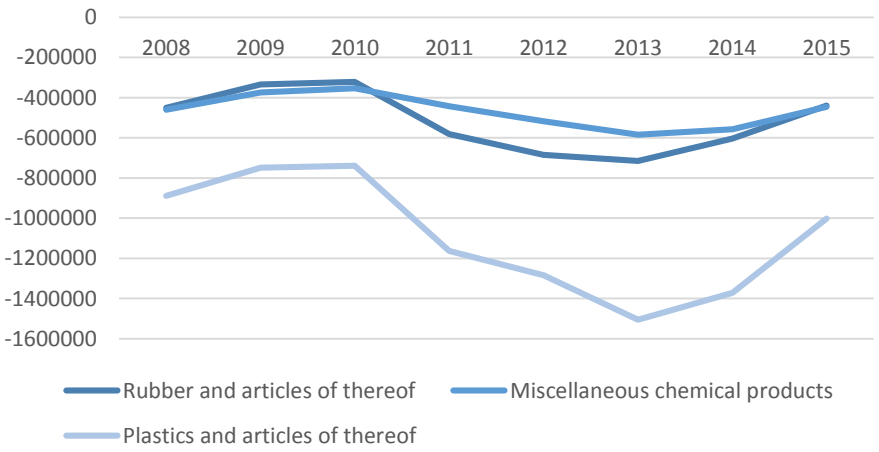
Dynamics of exports and imports of chemical products, USD th. (2008-2015)

Source: International Trade Center, Samruk Kazyna

Kazakhstan remains a net importer of chemical products, with imports being much more diverse and having more value added. However, if we exclude pharmaceuticals (HS 30) from imports and exports, which is a common practice in analyzing chemical products trade, turnover is more balanced. While the overall trend remains the same, we can notice that in 2010 Kazakhstan was a net exporter of chemical goods, due to a significant decrease in imports. However, despite constant export growth in 2011 and 2012, trade balance remained negative. In 2014 and 2015, exports remained more or less constant, while imports fell by 9.9% and 24.6% respectively. This was due to the overall slowdown of the economy and the rapid devaluation of tenge.

Partially this can be explained by the fact that, starting from 2013, Kazakh producers were able to substitute some imports, namely plastics, rubbers and miscellaneous chemical products (HS 39, 38 and 40 respectively). Still, analysis of the commodity structure of the chemical industry shows that Kazakhstan exports and imports many identical chemical product sub-groups, but imported chemical products have higher value added and generally are more refined/processed, compared to exported products. Overcoming this trend is one of the strategic priorities for the development of the Kazakh chemical industry.

Balance of trade in selected chemicals, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

At the moment, by far, the largest exported products are inorganic chemicals, reaching USD3.02bln in 2015, of which USD2.26bln were exports of radioactive chemicals and isotopes, according to the data from the International Trade Center (ITC). Radioactive elements (namely uranium pellets) produced in Kazakhstan, are in great demand on the global market. The main consumers of these products are China, Russia and developed countries, such as France, US and Canada. Another large exports article is alumina (HS 2818), which is produced by JSC Aluminium of Kazakhstan. As of 2015, Kazakhstan is tenth largest exporter of aluminum oxide to the global markets.

4. Potential markets for Kazakhstan's chemical industry

Rapid development of other industries, such as oil & gas and metallurgy, create conditions for growth of the chemical industry. Location of the major chemical plants is explained by geographical proximity to either sources of raw materials or consumers of chemicals. Thus, numerous chemical plants producing nitrogen, phosphate, potash, complex mineral fertilizers are located in Zhambyl, Aktobe, Atyrau and South Kazakhstan regions. While others are located close to industrial zones and regions with skilled workforce, R&D centers (specialized and household chemicals in Pavlodar, Karaganda, East Kazakhstan regions and Almaty, caustic soda in Pavlodar, sulfuric acid in Akmola, Kzyl-Orda and Zhambyl regions, rubber products in the Karaganda region).

One of the most important recent developments in Kazakhstan's chemical industry is the establishment of the United Chemical Company (UCC) in 2009. UCC is the main operator of the government's SPAIID for the chemical industry. The company aims to modernize existing Kazakhstani chemical enterprises and to establish new production plants for more than 20 new types of chemical products, including high-tech, export-oriented and innovative products with high added value: sodium cyanide, potassium sulfate, polypropylene and propylene oxide, glyphosate, calcium chloride, polyethylene, polyvinyl

chloride, superplasticizers for concrete, additives to oils, flotation reagents, and other products. For the purposes of this report, we have selected several products for a detailed analysis of global supply and demand.

4.1 Polypropylene

The global polypropylene (PP) market is the second largest polymer industry in the world making up 25% of global polymer demand. This market is highly dependent on commodity prices, and has a large number of global and regional manufacturers. Recent decline in prices of oil and gas as a result of the recent shale revolution, promotes investments into new capacities in North America (shale gas) and China (coal) and will have significant effects on the global PP market and regional competitiveness.

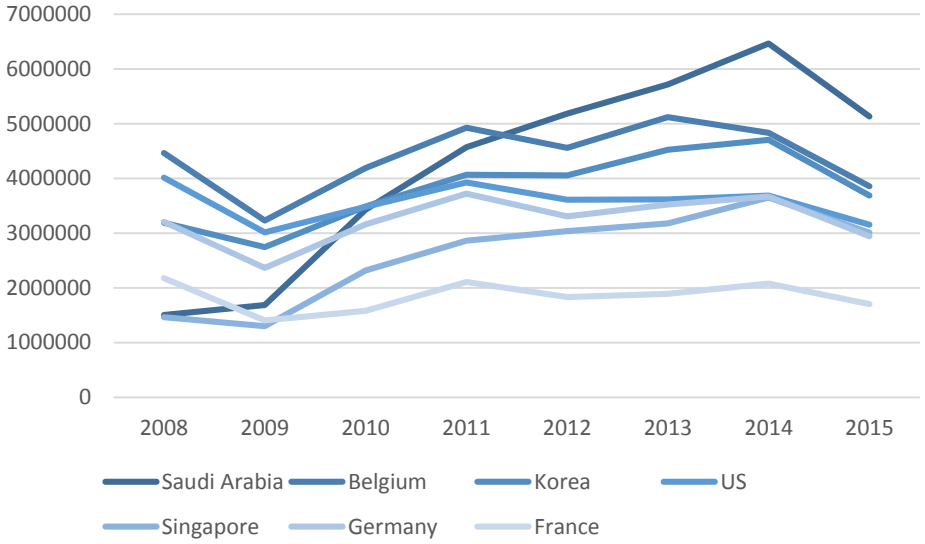
Competition in this market is considered to be on one of the highest levels among other markets of polymeric materials. To succeed in the global polypropylene market, key market participants are actively investing in the modernization of production assets and R&D. Overall, the market is currently near equilibrium, with capacity utilization of 83% as of the beginning of 2015.

To date, the global polypropylene market leaders are such industrial giants as: BASF, Borealis AG, Braskem, Chevron Phillips Chemical Company, DuPont, ExxonMobil, Reliance Industries Limited, Sinopec, LyondellBasell Industries, SABIC, Bayer Material Science, Fulton Pacific, INEOS, Total SA, Washington Penn Plastic Company Inc., PetroChina Company Limited, Qatar Petrochemical Company and Japan Polypropylene Corporation.

Taking into account a number of factors, most experts agree that these companies will retain their positions until 2022. General opinion is that despite significant growth of the market, its structure, geographical allocation and consumer patterns are not going to significantly change.

Asia-Pacific region accounts for more than half of the PP production capacity. PP production is expanding fast, especially in China, where major investments in new capacities attempt to improve China's self-sufficiency. According to projections, Chinese propylene production will increase to nearly 40 mln metric tons by 2020 to satisfy internal demand. In 2015, China produced 18 mln tons of PP, 18% more than a year earlier. 2015 and 2016 show the highest level of new PP production capacities, but additions in the medium term are projected to be near the demand growth pace. Largest exporters of PP include Saudi Arabia (12.9% of global exports), Belgium (9.7%), Korea (9.3%) and US (8%).

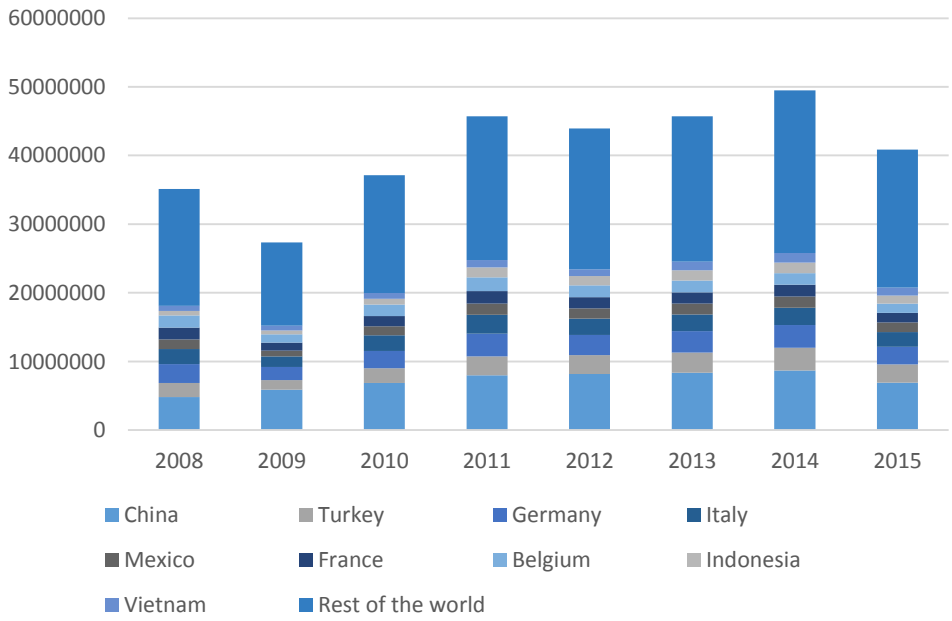
Largest exporters of polymers of propylene, incl. PP, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

China remains the largest global importer of propylene and other polymers of propylene with USD6.9bln in imports. However, global demand (global imports of USD40.9bln) is more-or-less evenly distributed, since main usage of PP is for packaging (about 50%). Europe is also a big market for PP with 2.5 mln tons imported in 2015. Europe's economic growth might well remain very low, but its consumption is likely to increase, while capacity additions are unlikely due to competitive disadvantages.

Imports of polymers of propylene, incl. PP, USD th. (2008-2015)

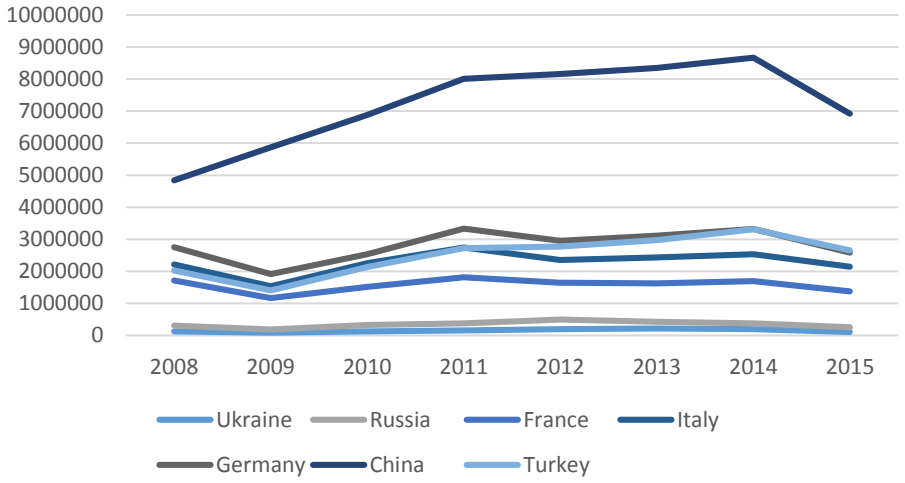


Source: International Trade Center, Samruk Kazyna

Kazakhstan's PP exports amounted to only USD23.7mln in 2015; major export flows went to Russia, China, Turkey and Ukraine. All of the selected markets showed a decrease in imports in 2015 compared to 2014, with China showing the largest drop in absolute terms. This is due to the decrease in PP prices in line with a drop in oil prices, as well as China introducing huge production capacities to satisfy local

demand. On the other hand, Turkey as one of the major importers of Kazakh PP, having no own material base continues to increase imports (continuous growth up to USD3.3bln in 2014).

Imports of PP by selected countries, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

Analysis of mutual trade with Russia shows that Kazakhstan remains a net importer of PP, however trade balance is improving with Kazakhstan increasing its own production to substitute imports from Russia. Current projects of the UCC, including the Polymer Production Plant in Atyrau region (4,800 kilotons per annum of PP bags and 11,000kTa of PP films), launched in 2015, will allow Kazakhstan to significantly increase its PP exports. Another project that is being currently developed and will be launched in 2020, is the PP production in the Atyrau SEZ (500kTa), operated by the Kazakhstan Petrochemical Industries.

While Kazakh producers have a competitive advantage in terms of feedstock and tax incentives, they still lose to some of their competitors from Russia, which have the same competitive advantages and are exporting to the same markets. Heavy competition on the global and internal PP market from China, Russia and recently Uzbekistan, is one of the major obstacles for the development of this industry. Russia has 12 facilities with a total capacity of 1.7 million tons of polyethylene and 1.8 million tons of polypropylene. In 2015, Russian polypropylene plants jointly produced 1.28 million tons of PP, demonstrating two-digit growth despite the general downturn of industrial production in the country. Russian exports of PP exceeded imports for the first time ever, due to the devaluation of ruble.

Ustyurt Gas Chemical Complex (Uzbekistan) has the capacity to process up to 4.5 billion cubic meters of natural gas, producing 3.7 billion cubic meters of marketable gas, 83 thousand tons of polypropylene, 387 thousand tons of polyethylene and 102 thousand tons of pyrolysis distillate, as well as other chemical products.

Kazakh producers still have an opportunity to grow. Increasing demand for PP materials from various industries, such as automotive, construction materials and packaging, is going to be the main driver of growth for the polypropylene industry. According to analysts (PlasteMart.com), by 2020, the volume of global demand for polypropylene will reach 70.81 million tons, amounting to USD138.36bln. By 2022, the demand will reach 87.35 million tons, or about USD170bln, indicating an average annual growth rate of 5.2%. For Kazakh producers, capturing a part of the growing PP market will require strategic

planning, modernization of production capacities, investments in marketing and logistics to overcome regional and global competition.

4.2 Fertilizers

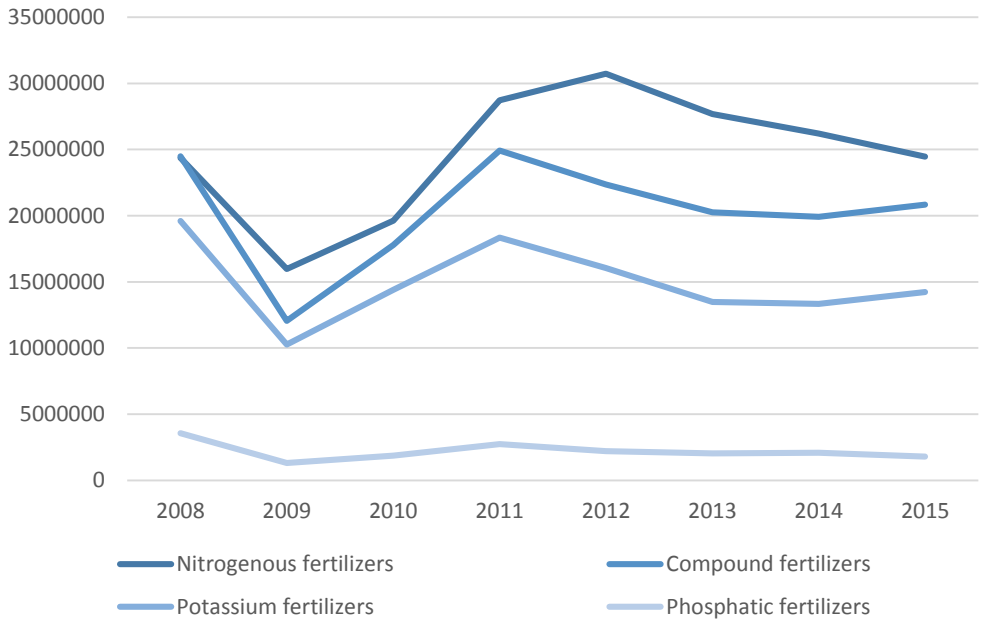
Global trends in agricultural development have a major impact on the dynamics of production and consumption of fertilizers. Given the outlook on population growth, consumption of agricultural products will increase by 60% in 2030, compared to 2008. Growing demand for crops with limited land resources will require a great increase in productivity, which in turn will stimulate demand for fertilizers. According to various projections, Eastern Europe, Central Asia, South Africa and Southeast Asia will experience fastest growth in demand.

However, over the last several years, global market for mineral fertilizers was stagnating and the short-term outlook is somewhat unfavorable. Global demand for fertilizers is expected to increase by an average of 1.4-1.5% per year for the nitrogen group, 1.9-2.2% for phosphoric and 2.8-3.3% for potash. The most important factors determining the demand for mineral fertilizers in the coming years will be the growth of the Indian economy and the recovery of the Brazilian economy. At the same time, the slowdown of the Chinese economy adds uncertainty. If domestic demand for fertilizers in China will grow slower than the output, large-scale Chinese exports can bring down the global market.
The global fertilizer industry is characterized by several features:

- direct dependence on the availability of raw materials: natural gas, coal, naphtha (for nitrogenous fertilizers), phosphates (for phosphate fertilizers) and potassium-containing materials (for potash)
- capital-intensive production,
- concentration of production near the sources of raw materials or consumer markets,
- construction of large plants in order to reduce the cost of production per unit,
- large trade flows in resources and precursors due to the uneven geographical distribution of natural resources between countries.

To date, the largest producers of mineral fertilizers in the world are China (21% of the global market), US (13%), India (10%), Russia (8%) and Canada (8%), while Southeast Asia and Latin America are the largest consumers of mineral fertilizers. The volumes of international trade in mineral fertilizers and raw materials for their production are increasing every year. Largest suppliers of mineral fertilizers to the global market include PotashCorp (Canada), Mosaic (US), Belaruskali (Belarus), OCP (Morocco), Agrium (Canada), Uralkali (Russia), Sinochem (China). In 2016, global fertilizer industry continues to face overcapacity and intensified competition. Major producers have begun rationalization and consolidation to reduce costs and improve operational efficiency.

Global exports of fertilizers, USD th. (2008-2015)



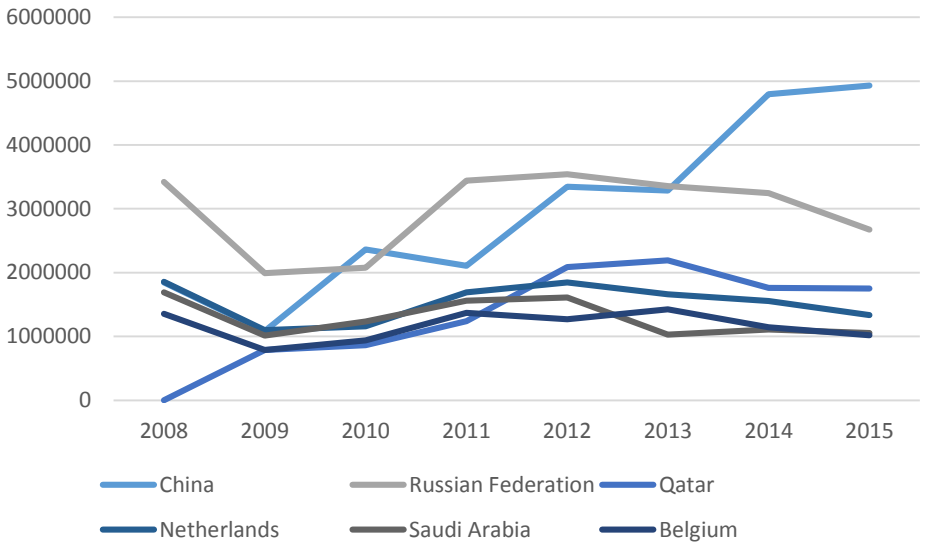
Source: International Trade Center, Samruk Kazyna

Kazakhstan has a unique resource base that allows production of the entire range of fertilizers: nitrogen, phosphate and potash. Kazakh agrochemical sector has a huge potential on the domestic and external markets. Currently, the fertilizer market is underdeveloped, since domestic use of chemicals in agricultural production is almost 10 times lower, compared to global leaders in agriculture. Modernization of existing production capacities and new large projects, such as the LLP EuroChem complex mineral fertilizer plant and LLP Batys Kali, will increase the range of products and production volume to saturate the domestic market as well as to increase exports to the CIS countries and the Middle East. Attracting major international agrochemical producers will allow Kazakhstan to develop its own R&D base, use existing distribution channels and develop agrochemical services, such as counseling.

Nitrogenous fertilizers

Nitrogen fertilizers are made from ammonia, which is produced using natural gas. This ammonia is used as a feedstock for all other nitrogen fertilizers, such as anhydrous ammonium nitrate and urea. It is by far the most common group of fertilizers, accounting for as much as 40% of global fertilizers exports. In 2014, China surpassed Russia as the largest exporter of nitrogenous fertilizers.

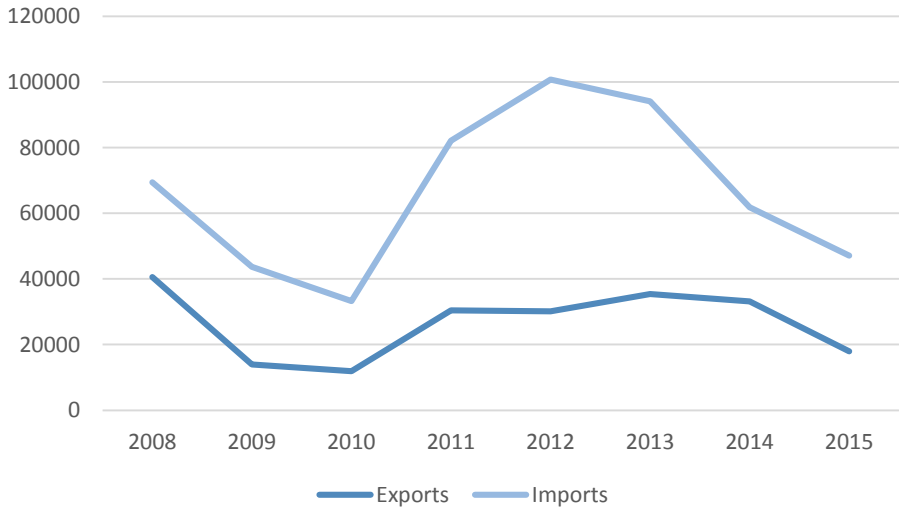
Largest exporters of nitrogenous fertilizers, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

Kazakhstan's exports of nitrogenous fertilizers are minimal compared to regional competitors despite increasing volume of production. Exports decreased from USD33.2mln in 2014 to USD18mln in 2015, indicating that Kazakh producers are trying to satisfy domestic demand. Indeed, imports of nitrogenous fertilizers decreased from an all-time high of USD100.8mln in 2012 to only USD47.1mln in 2015.

Kazakhstan's exports and imports of nitrogenous fertilizers, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

Abundance of natural gas (methane) provides all the prerequisites for the chemical industry to increase production of nitrogenous fertilizers. The main resources are located in Karachaganak, Tengiz and Kashagan. LLP KazAzot, which is the only producer of ammonia in Kazakhstan, is preparing to increase production after the modernization of its facilities, financed by JSC Development Bank of Kazakhstan. Modernization will increase production capacities by 350 kTa, reduce the cost of production by 34%, as well as establish a full production cycle – from extraction and processing of raw materials to marketing and distribution of finished products. Current production capacity of the LLP KazAzot is 290 kTa.

Over 1Q16, the company exported 34.5 thousand tons worth KZT2.2bln (USD6.17mln), which is almost 3 times more than in 1Q15. By the end of the year, KazAzot plans to export additional 82.7 thousand tons of ammonium nitrate to Ukraine, Russia and Kyrgyzstan. Main competitors on the ammonium nitrate market include Uzbekistan (3 plants), Russia (13 plants) and Ukraine (6 plants).

The global market for ammonium nitrate experiences moderate growth. In recent years, it grew by 3% per year on average. Its production is heavily regulated, due to the fact that ammonium nitrate is also used as a precursor for production of explosive materials (about 35% of global consumption). Therefore, producers of fertilizers often shift to other ammonium products to meet the demand in the agricultural sector: calcium ammonium nitrate and phosphatized ammonium nitrate. Consumption of AN and other nitrogen fertilizers in Western Europe and other regions also declined because of changes in agricultural subsidy policies. Urea has become the leading nitrogen fertilizer, as there are no major safety issues, it has a higher nitrogen content, and is usually less expensive to produce. Ammonium nitrate is imported by CIS countries (25%), North American countries (21%), Western Europe (12%) and East Asia (12%). Consumption is expected to increase at 2.3% annually during 2015–20. China, Southwest Asia, and Southeast Asia are projected to have the highest growth rates.

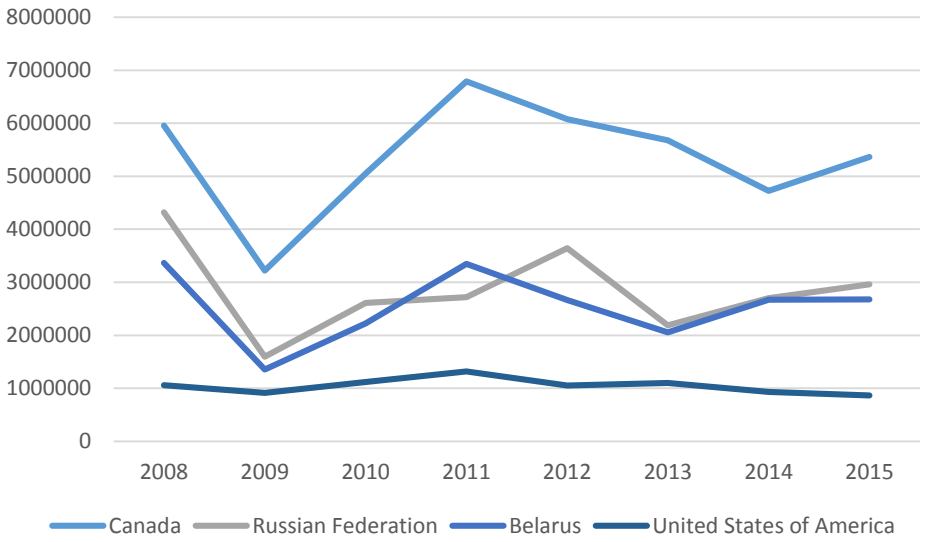
For the first time in a decade, due to the removal of close to 15 Mt of ammonia capacity in China in 2015-2016, capacity in East Asia will show virtually no net growth. Nevertheless, according to International Fertilizer Association, global ammonia capacity would reach 230 Mt in 2020, expanding by 10% compared with 2015. Large increases in capacity are expected in Africa, North America and Eastern Europe and Central Asia (EECA). Regional deficits are expected to further expand in South Asia, Latin America and Oceania, suggesting growing import demand for nitrogen products in all forms. Africa, EECA and, to a lesser extent, West Asia will experience regional surpluses.

As in many other sectors, Kazakh producers will face regional competition on external markets, namely from Russia and Uzbekistan, however, there is a lot of potential in substituting imports on the domestic market. Modernization of production facilities and cheap feedstock will provide cost competitiveness.

Potash

Potassium is the third major plant and crop nutrient after nitrogen and phosphorus. World's largest consumers of potash are China, the US, Brazil, and India. Brazil imports 90% of the potash it needs. Global potassium market is heavily concentrated, since three of the largest exporters, Canada, Russia and Belarus, provide more than 75% of total exports.

Global exports of potassic fertilizers, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

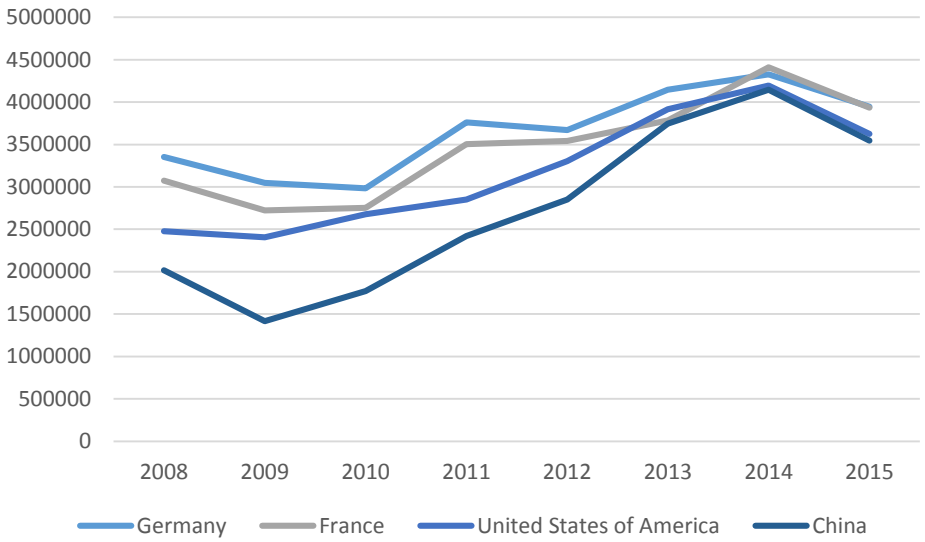
Over the past 10 years, potash industry experienced a large boom, with prices rising as high as USD1,000pt. This boom encouraged a glut of new supply projects, which caused a massive overcapacity that led to the prices dropping to USD295pt at the end of 2015. While the increasing population guarantees long-term growth of demand, current overcapacity can not be absorbed by the market in the coming years. With numerous large projects and six new mines coming into operation between 2016 and 2020, global potassium capacity is forecasted to grow by 22% compared to 2015, to 64.5 Mt in 2020.

Kazakhstan has more than 6 billion tons of confirmed potash reserves that are concentrated mainly in the western part of the country. Despite such abundance of feedstock, current volume of production and exports of potash is minimal. Several companies, including LLP Batys Kali and Kazakhstan Potash Corporation have already started production and invested in development of additional capacities. For example, Kazakhstan Potash Corporation has invested USD631.6mln USD. UCC is considering a project, requiring investments of USD1.6bln, in Zhambyl region with production capacity of 300kTa. Given the unfavorable outlook for the global potash industry, we believe that potassium production would have low economic efficiency.

5.3 Pesticides, herbicides and insecticides

Pesticides market is essential to the global agrochemistry industry. Increased demand for biofuel crops and genetically modified (GM) seeds caused pesticide sales in Brazil to increase more than 1.5 times over the last five years, with Brazil surpassing the US to become the largest importer in the world. China became the fourth largest national market as rising pesticide production in the country improved domestic availability and use rates. Global exports of pesticides have been continuously growing, reaching an all-time high of USD34.96bln in 2014. As of 2015, Germany, France, US and China are the largest exporters, accounting for more than 47% of global exports.

Largest exporters of pesticides, USD th. (2008-2015)



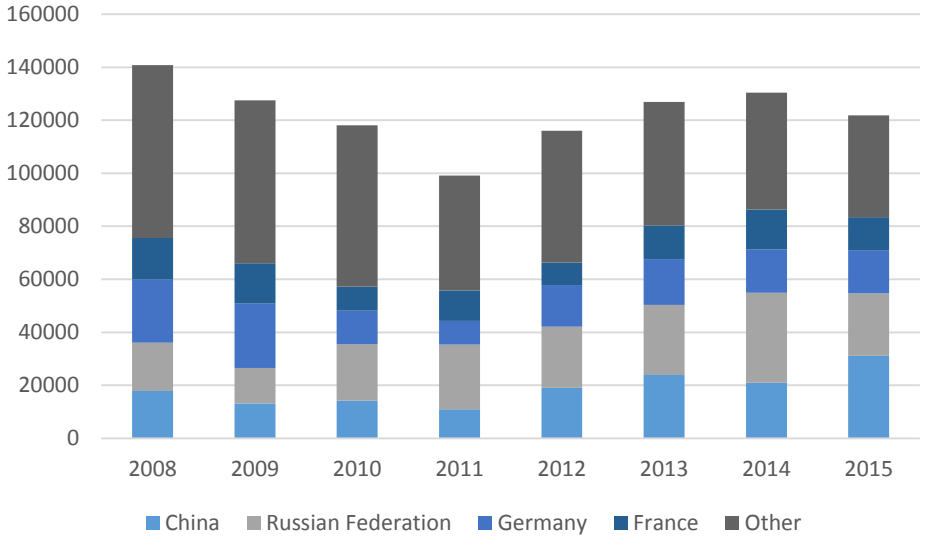
Source: International Trade Center, Samruk Kazyna

Herbicides account for the largest percentage of expenditure on pesticides worldwide, primarily due to large expenditures in developed countries. However, their use in developing countries is increasing as well. Recent increased use of genetically modified herbicide resistant crops has been associated with a significant increase in herbicide use.

Synthetic herbicides currently dominate the global herbicide market due to their commercial availability, cost efficiency, and limited commercialization of Bio herbicides. Glyphosate, a broad-spectrum & non-selective herbicide holds the largest market share among other herbicides. Glyphosate segment is expected to grow at a compound average growth rate of 5.7% between 2014 and 2020, second highest among all, in terms of volume.

However, the synthetic herbicide market faces several challenges, which can potentially impede growth. Glyphosate, the most used herbicide in the world, has been under evaluation in EU since 2012 due to the fact that it can be potentially carcinogenic. As of 2016, seven EU states already have extensive glyphosate prohibitions, two have restrictions and four countries have impending or potential bans. Increasing regulation of glyphosate and other herbicides may limit market growth in the nearest future. Herbicide resistance is another key issue that will be shifting demand towards innovative products, such as bio herbicides. Major companies such as BASF, Monsanto, Dow Chemical Company are already investing in R&D to develop bio herbicides. Nevertheless, cheap prices of synthetic herbicides have been acting as a major barrier to the growth of bio-herbicides market.

Kazakhstan's imports of pesticides by country, USD th. (2008-2015)



Source: International Trade Center, Samruk Kazyna

Kazakhstan is a net importer of pesticides, with imports reaching USD121.9mln in 2015. Major suppliers of pesticides on the Kazakh market include China, Russia, Germany and France. Exports of this product group declined from USD2.6mln in 2010 to just USD317th in 2015. Kazakh producers have been unable to satisfy internal demand, which is estimated at 16-18kT per year. To resolve this issue, LLP Astana-Nan Chemicals is planning to expand its production of glyphosate to 15 kTa in 2016, while United Chemical Company is currently developing a project with financing from China Development Bank. The project will start operating in 2H18 with a production capacity of 10kTa of glyphosate and 3kTa of glyphosate formulation, as well as phosphorous trichloride, which is a precursor to a number of pesticides.

The outlook of the pesticide industry looks fairly positive, however, increasing regulation and development of new products might constrain demand for glyphosate, which is the main product of the Kazakh pesticide subsector.

5. Key trends in the global chemical industry

Amidst the slowdown of the global economy, falling commodity prices and overall uncertainties that induce companies to focus on survival, the chemical industry is witnessing the rise of some key trends that offer huge potential. The key trends that could significantly impact the global chemical industry are as follows:

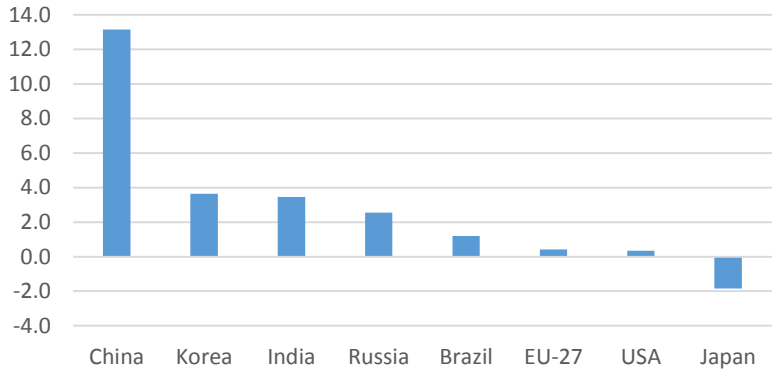
- Shift in global growth dynamics: Asia is the main driver of the chemical industry.
- Demographics change: urbanization, population growth and growing living standards increase demand for high quality chemical products, foods, healthcare etc.
- Increasing role of R&D: innovation lies at the heart of the chemical industry.
- Globalization and consolidation of the chemical industry: chemical industry becomes more concentrated resulting in increased competition on the global market.
- Shale gas and oil revolutionizing the chemicals market.
- Green growth and strengthening regulation will require constant productivity growth.

These trends are already having an impact both supply and demand in the chemical industry and will play a greater role in determining demand for new materials. They are driving new developments in technology and influencing changes to standards and regulations.

5.1 Asia is the main source of growth

Strong growth of demand for chemicals in China, India and other emerging countries and low growth in Europe and North America was the major trend of the last 20 years and it is expected to continue well into the future. By 2030 China is projected to remain the largest global chemicals producer, having 44% of the global market share. Although competition on the Chinese chemicals market is constantly increasing and demand growth is weaker than in the past, China still offers a huge and attractive market for both chemical suppliers and customer industries.

Average annual production growth, 2004-2014



Source: European Chemical Industry Council, Samruk Kazyna

Growth in Europe will remain on lower levels, mainly due to saturated markets and an ageing population. Other factors that will impede growth in Europe include lack of own energy and livestock, high labor costs, regulatory and tax burdens, among other things. Nevertheless, European chemical producers are expected to retain control over a big part of the market due to their high technological capabilities and innovative products. European Chemical Industry Council expects chemicals sales to reach the level of EUR6.3tln by 2030, thus European chemical industry is expected to drop down to the third place in the world in terms of sales.

Despite the recent deceleration trends in China, most of the GDP growth will take place outside Europe in the decades to come. Therefore, China will retain its position as the most important market for global chemical companies and a major investment destination. Whilst Chinese national and private chemical companies are gradually increasing their output in specialty chemicals, China will remain the largest importer of commodity chemicals in the medium term. Population growth, change in consumer patterns and growing middle-class in China and other Asian countries will be driving demand on the chemicals market.

5.2 Demographics change

Rapid population growth and urbanization in Asia, ageing of the population in Europe and other developed economies, change in consumer demand patterns will all have a big impact on the chemical industry and neighboring economy sectors. Growing demand for quality healthcare, increased consumption of foods and consumer chemicals, rapid growth of consumer electronics present opportunities for the chemical industry.

Given limited land resources, agrochemistry will play a vital role in providing food for the increasing population, while biochemistry would be required to reduce waste. Until 2035, global fertilizer and pesticide markets are expected to show annual growth of 3.3% and 4.7% respectively, as a result of population growth and an increase in food consumption. At the same time, growing middle class in developing countries will increase demand for cars, clothing, personal electronic devices and healthcare products, all of which require chemicals for production. The market for specialty and consumer chemicals will be growing, but companies would have to adapt their strategies in order to capitalize on this growth.

5.3 Increasing role of R&D

While increased globalization and overall reduction in protectionism on global markets stimulate competition, they provide an incentive for companies to develop new markets through innovation and to stimulate production efficiency. New technologies are laying the foundation for future growth and are the key to success for any company operating in the chemical business. Investments in research and development (R&D) provide competitive advantages for companies on the ever-changing chemicals market, while relieving environmental and social stress for the entire industry.

Chemical industry is a driver and an enabler of innovation in diverse subsequent value chains through new products and technologies. European producers, being on the edge of innovation, spent an average of EUR8.2bln per year on research and development from 2004 to 2014. Meanwhile, the average value of R&D spending was EUR9.6bln per year in the US and EUR5.9bln in Japan. Innovation and global competitiveness are interconnected: investments in R&D ensure competitiveness, while competitiveness promotes innovation by generating resources to be allocated for R&D.

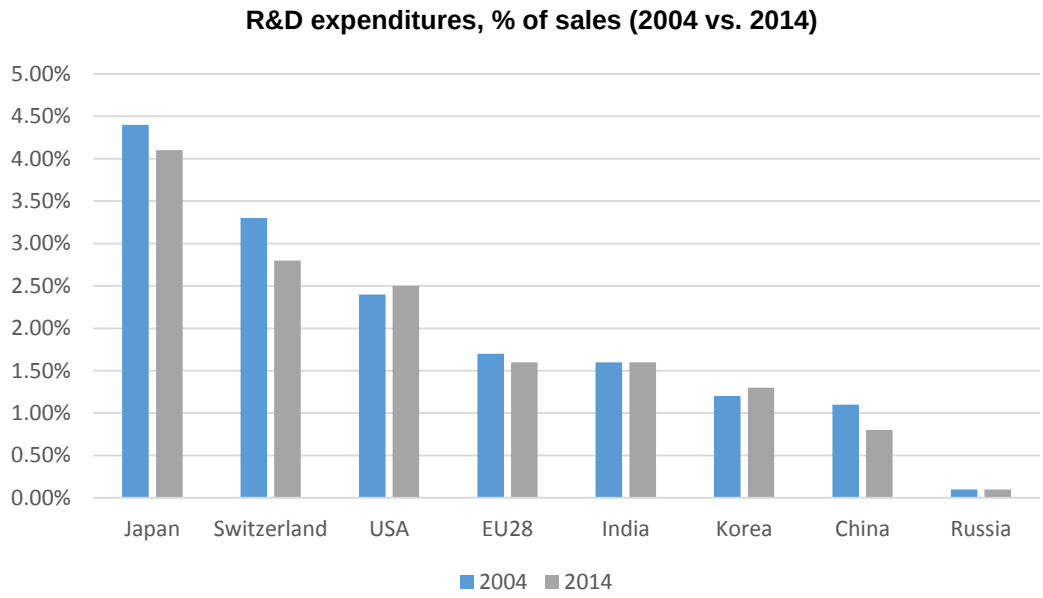
R&D and capital expenditures, % of sales

Country	R&D		CapEx	
	2004	2014	2004	2014
Japan	4.4%	4.1%	4.3%	4.4%
Switzerland	3.3%	2.8%	NA	NA
USA	2.4%	2.5%	2.9%	4.3%
EU28	1.7%	1.6%	3.4%	3.4%
India	1.6%	1.6%	2.9%	4.0%
Korea	1.2%	1.3%	4.4%	4.1%
China	1.1%	0.8%	7.8%	6.9%
Russia	0.1%	0.1%	6.2%	9.5%

Source: European Chemical Industry Council, Samruk Kazyna

For some countries, such as China and Russia, R&D spending was not a priority, while their capital intensity was significantly higher than average in the world with spending aimed at increasing output capacities. EU capital spending was more balanced with R&D intensity of 1.6% on average between 2004 and 2014. However, countries such as Japan and US prioritized R&D spending over investments into increasing output capacity. High value-added products of the chemical industry continuously open

up new fields of application, stimulating progress and innovation in numerous other industries, such as healthcare, food, consumer goods, telecommunications, electronics, aerospace and automotive.



Source: European Chemical Industry Council, Samruk Kazyna

Investment in research and development involves a high degree of risk, since there is no guarantee of return. Successful innovations, however, could have a 20-30% return or even revolutionize the entire value chain. Today, most chemical companies allocate 2-3% of their sales towards research and development. Intangible assets such as patents, know-how, human capital, brand image, and information are capable of multiplying the value of products, especially in the chemical industry.

At the same time, innovation goes beyond R&D with companies redesigning and modernizing their business processes. Active digitalization, crowd-sourcing and other innovations are rapidly changing the business environment. Thus, in the near future, investment in research and development is a necessity rather than an option.

5.4 Globalization and consolidation of the chemical industry

Global chemical industry depends increasingly on tightly intertwined clusters that are becoming a huge part of global value chains. Weak market growth, due to poor global economic performance, pushes companies to re-scale and consolidate assets to reduce costs and improve efficiency. Over the past two decades, major chemicals producers have been heavily involved in various mergers and acquisitions to capture the entire value chain. Huge private, government and quasi-government corporations are enhancing their production cycle and presence on customer markets with scale and efficiency.

This is relevant for most companies in both emerging and developed economies. For example, the merger of Dow and DuPont is the most significant deal in the chemical industry to date. Other examples include ChemChina's bid for Syngenta (agricultural chemicals company) and KraussMaffei (machinery manufacturer), as well as AkzoNobel's deal for BASF's industrial coatings business. The Dow-DuPont merger will create a gigantic new enterprise with a market capitalization of about USD130bln that will be split into three companies, focusing on agriculture (USD19bln in revenue), materials (USD51bln) and specialties (USD13bln). This deal will affect the entire industry, promoting asset consolidation,

greater economies of scale and customer coverage. Recent developments in terms of M&A will result in DowDuPont and ChemChina becoming global leaders on the chemicals market, especially in agro chemistry.

Undoubtedly, the trend for consolidation, vertical and horizontal expansion and M&A among large corporations will remain strong in the near future, with companies seeking to expand market coverage, cut operational expenditures and optimize production. Competition on the global chemicals market will constantly increase in the near-future.

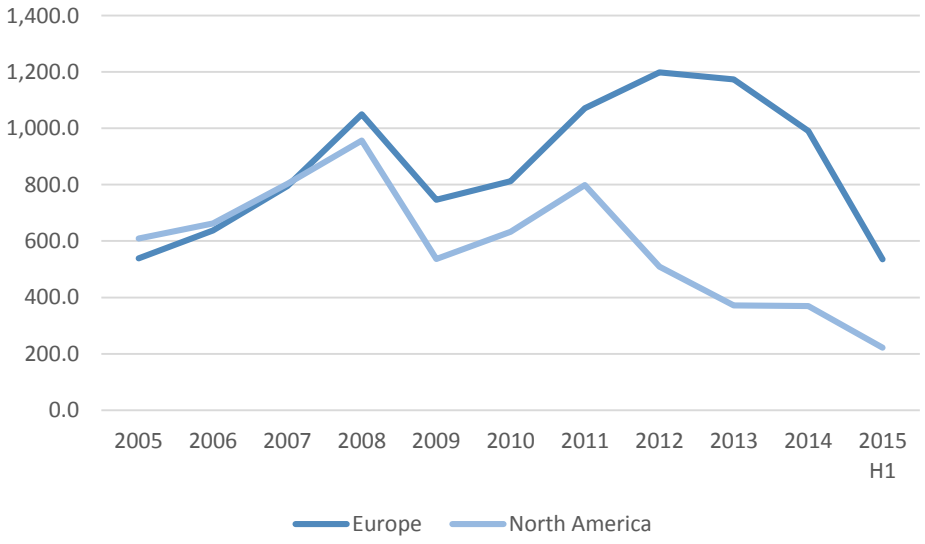
5.5 Shale gas and oil revolutionizing the chemicals market

Crude oil market and chemical industry are closely intertwined, since oil prices affect the production of petrochemicals, which is the largest subsector of the chemical industry, and energy prices affect the cost of production, since chemical industry is very energy-intensive. Changes in the price of crude oil immediately impact the cost of basic precursor chemicals such as ethylene, propylene, naphtha, and liquefied petroleum gas. The ramifications of such price shocks spread to downstream chemical producers, thus price volatility affects the cost structure of the entire industry. Chemical companies must be ready to adjust their business process in response to price volatility.

The shale gas revolution in the US is currently affecting producers not only in North America, but also in Europe, Asia and other regions, as the availability of energy and feedstock creates a significant competitive advantage for the US industry. With the exception of resource-rich countries abundant with energy and feedstock resources, regions not having access to shale gas are suffering from competitive disadvantages. However, shale projects are being developed on a global scale, so other countries might be able to reap benefits in the near future.

Cheap feedstock for the chemical industry has already affected the cost of production. For example, the price of ethylene, which is one of the most important organic chemicals used as the building block for a vast range of chemicals, in the US has decreased from USD799 per ton in 2011 to USD222 per ton in 1H2015. Meanwhile, price for European producers did not decrease as much and remains much higher than for their North American counterparts.

Cash cost of ethylene, USD/ton (2005-2014)



Source: Independent Chemical Information Service, Samruk Kazyna

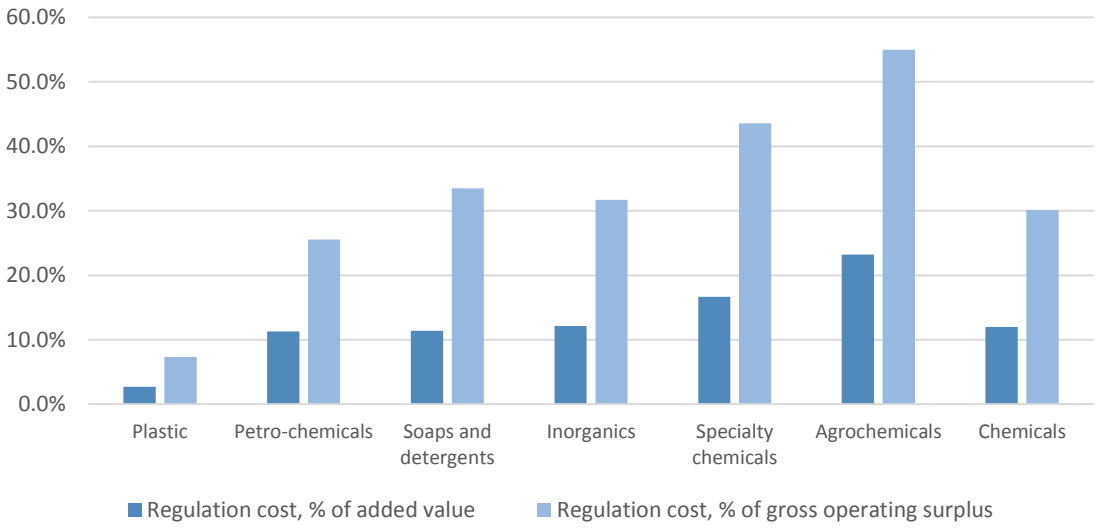
Recent developments in the US mining industry have large implications for the European market. US is by far the EU's biggest trading partner in chemicals, since in 2014 US imported EUR25.5bln of EU exports, whilst providing EUR20.4bln of EU imports. Transatlantic trade flows are expected to change considerably in the next five years, because the US shale gas revolution has triggered a massive build-up of new chemicals production capacities. This is especially important for sectors such as petrochemicals and polymers, in which raw materials can account for as much as 60% of operating costs, being used both as feedstock and energy source. With global competition in the chemical industry remaining very high, access to raw materials and energy at competitive prices remains a prerequisite for future growth.

While, there are several feedstock alternatives to oil and gas, including biomass, coal-to-liquid and others, the challenge lies in the volatility of oil prices, which causes the economics of these alternatives to swing from wildly favorable to unfavorable. Significant capital is required to prove the viability and scalability of any new technology. For the near future, there is no clear, commercially viable alternative to traditional feedstock in sight.

5.6 Green growth and strengthening regulation

Chemical industry is heavily regulated in regard to health, safety and environmental protection, as well as climate change and energy issues. Tightening regulatory environment for the chemical sector results in increased cost of production and reduced competitiveness, especially for producers in advanced economies. For example, regulation costs for European agrochemicals producers could amount to as much as 55% of gross operating surplus and 23.2% of added value, according to the Cumulative Cost Assessment for the EU Chemical Industry conducted by the Technopolis Group.

Cost of regulation for the EU chemical industry, 2015



Source: Technopolis Group, Samruk Kazyna

Three main drivers of regulatory cost for EU producers are: regulations on industrial emissions (33% of the cost), chemicals (29%) and worker safety (24%). The chemical industry will face an increasing cost to comply with stricter emission limit values and energy efficiency objectives in the nearest future. Without doubt, the cost of regulation will play an increasing role in determining the profitability of the chemical industry, not only in advanced economies, but also on a global scale. Nevertheless, developing markets are currently investing in extensive growth of output with little regard to

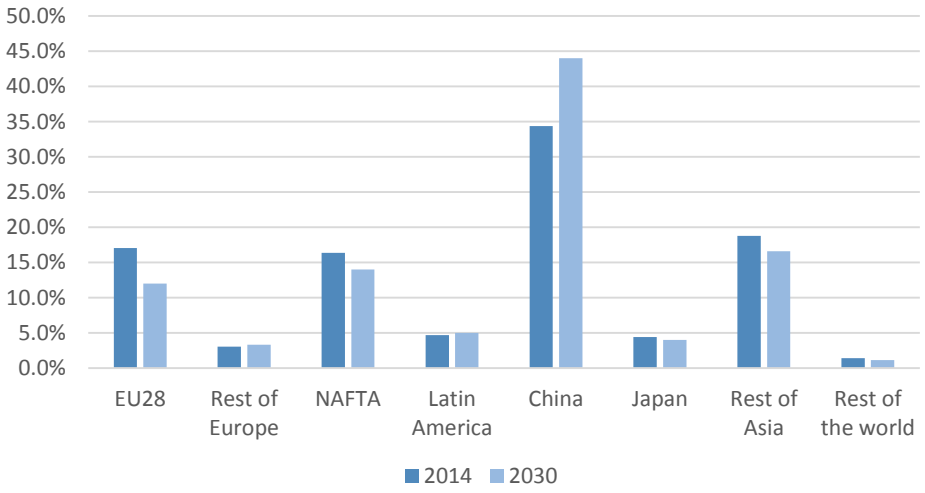
environmental regulation. Major MNC's are shifting energy and pollution-intensive production to emerging markets

6. Conclusion

Chemical products will play vital roles in solving many of the world's problems over the next 10 years and well into the future. The future of the chemical industry will likely be characterized by a number of fundamental market changes. These megatrends pose a threat to some of the traditional chemical subsectors, while providing an opportunity for growth to others. Companies that will make the necessary structural changes and keep their strategy in line with the market changes can take advantage as these megatrends unfold. Producers need to enhance their business models and be open to changes that will allow them to react to and capitalize on these megatrends.

By 2030, global chemicals sales are expected to reach EUR6.3tln, with pesticides and specialty polymers being the main drivers of growth. China's share of the global market will increase to EUR2.75tln or 44%, while EU, North America, Japan and the rest of Asia are going to lose their relative share of the market despite growth in absolute terms. By far, EU, affected by low population growth, increasing regulation, lack of cheap feedstock, will be the largest loser on the growing global market, with its share of sales decreasing from 17% in 2014 to 12% in 2030.

Share of the global chemical sales, 2014 vs 2030



Source: European Chemistry Industry Council, Samruk Kazyna

Global megatrends will continue to influence the chemical industry and provide potential growth opportunities, especially in such subsectors as agrochemistry, biochemistry, specialty chemicals. Kazakhstan's chemical industry has significant potential in some of these sectors, however, at the moment, the industry is underdeveloped due to low demand from manufacturing industries, physical depreciation of fixed assets and infrastructure, technological backwardness and high costs per unit of output.

Overcoming these difficulties will be a hard task in the ever-changing conditions of the modern chemical industry. Kazakh producers would have to adapt to new trends in demand, invest in R&D, modernize equipment and enhance logistics. Current and potential projects, carried out by the UCC, have a lot of potential on domestic market and abroad. Realization of this potential would require strategic planning with regard to global megatrends to fully employ existing competitive advantages.

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