

Deal Capsule

Transactions in Chemicals & Life Sciences

July 2018

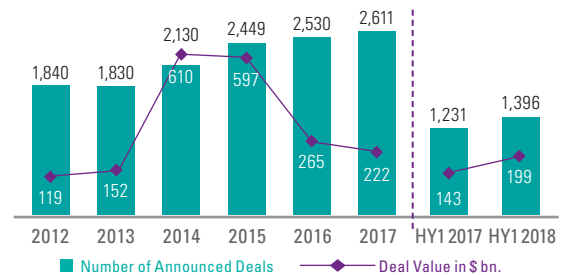
“ We are headed for a blockbuster M&A year as Life Sciences companies sharpen their focus while Tech and FMCG encroach on their territory. ”

VIR LAKSHMAN | HEAD OF CHEMICALS & PHARMACEUTICALS, KPMG IN GERMANY

HIGHLIGHTS

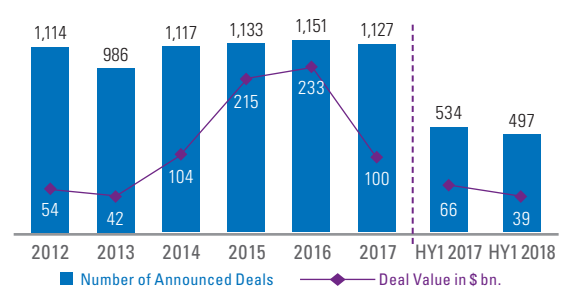
- In both sectors, US and China were the most active countries.
- Blockbuster deal, exceeding the \$60 billion mark announced in Life Sciences.
- Cannabis legalization in Canada drives M&A activity.
- Chemical players start reaching out into end markets through M&A.
- KPMG’s DealThermometer indicates that the environment for M&A activity will remain moderately strong in both life sciences and chemicals.

FIGURE 1: TRENDS IN LIFE SCIENCES M&A



Sources: Thomson One, KPMG Analysis

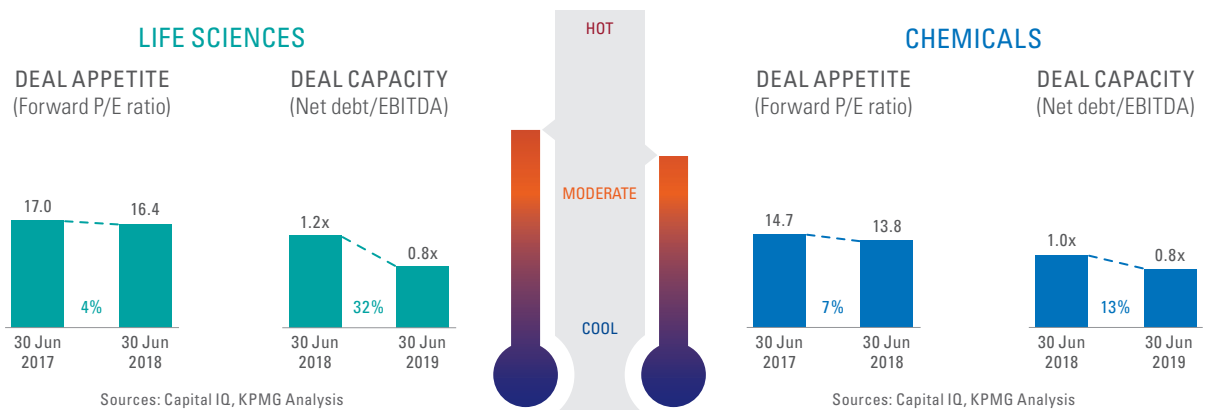
FIGURE 2: TRENDS IN CHEMICALS M&A



Sources: Thomson One, KPMG Analysis

DEAL THERMOMETER HY1 2018

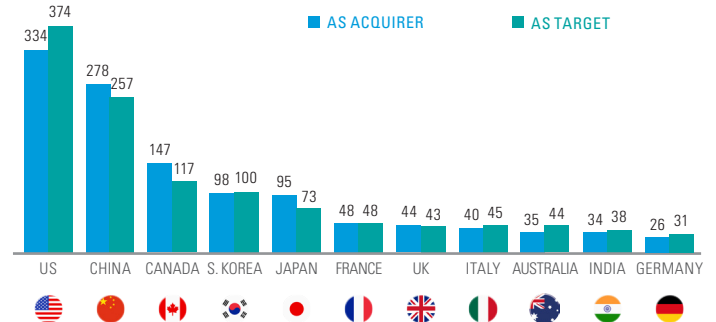
KPMG’s Deal Thermometer signals the environment for M&A deals in chemicals and life sciences. It combines the appetite for deals (changes in forward P/E ratios) with the capacity to fund deals (changes in Net Debt/ EBITDA multiples). ‘Hot’ signifies an environment conducive to deal-making.



Life Sciences

The value of the top 10 announced life sciences deals in HY1 2018 exceeded the \$100 billion mark, mainly driven by the blockbuster acquisition of Shire plc through Takeda Pharmaceutical Co. Ltd. Legalization of cannabis is driving M&A activity in Canada. US and China dominated the life sciences M&A landscape.

FIGURE 3: TOP COUNTRIES IN LIFE SCIENCES M&A HY1 2018*



* Number of announced deals

Sources: Thomson One, KPMG Analysis

WIDE-RANGING DEAL AREAS

After deal activity in Q1 2018 was mainly concentrated on the therapeutic areas of hematology and oncology, HY1 2018 announced life sciences deals are spread widely across all therapeutic areas.

Takeda accelerating growth

Takeda Pharmaceutical Co. Ltd. announced the \$62.3 billion acquisition of Shire plc. Shire offers market opportunities in the U.S. and complements Takeda with its leading global rare disease franchise. With its revised proposal, Takeda is currently offering \$30.33 in cash for each Shire share and either 0.839 new Takeda shares or 1.678 Takeda American depositary shares (ADSs). Takeda anticipates combined annual recurring pre-tax cost synergies of at least \$1.4 billion by the end of the third fiscal year after the completion of the deal.

Takeda has also announced a voluntary and conditional public takeover bid for outstanding TiGenix NV shares, warrants and ADSs for a total of \$0.6 billion. The deal will reinforce Takeda's commitment to patients living with inflammatory bowel disease and extends an existing collaboration between Takeda and TiGenix, established to commercialize darvadstrocel, a treatment of complex perianal fistulas in adult patients with nonactive/mildly active luminal Crohn's disease.

Gene therapy

Approximately one out of every 6,000-10,000 children born is affected by some form of spinal muscular atrophy (SMA). SMA Type 1, is the number one genetic cause of death in infants, where 9 out of 10 infants do not live to their second birthday or are permanently ventilator-dependent.

Novartis AG entered a \$8.7 billion definite agreement to acquire AveXis, Inc., whose lead product candidate AVXS-101 has promising clinical data in treating SMA Type 1 and could potentially be the first one-time gene replacement therapy for spinal muscular atrophy ever. U.S. patient availability is expected in 2019. The transaction broadens Novartis' strong position in the neuroscience market. Through the acquisition of AveXis, Novartis gains another gene therapy platform, complementing its CAR-T platform for cancer, driving gene therapies across therapeutic areas.

Oncology continues to attract investors

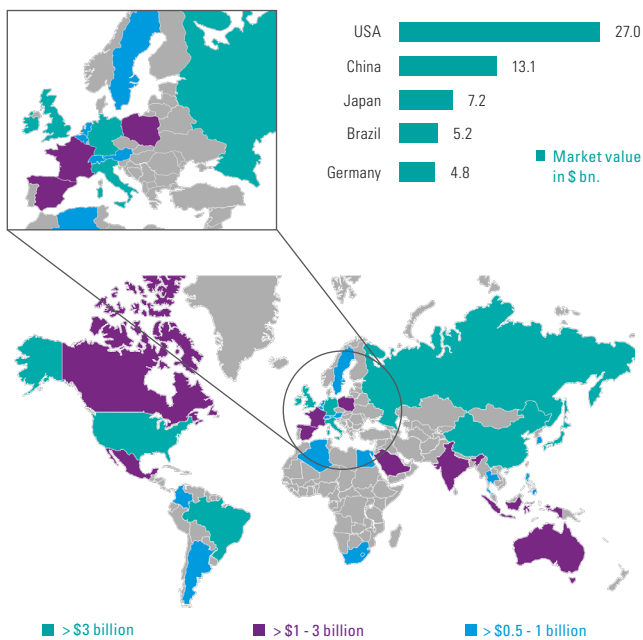
Oncology is still the largest therapy area in sales with a 2017 to 2024 CAGR of 12.2%, driving further consolidation. There were three oncology deals in the top 10 in Q1 2018 and M&A activity in this therapeutic area has continued into Q2.

Eli Lilly and Company announced the acquisition of ARMO Biosciences, Inc., a late-stage immuno-oncology company, for \$1.6 billion. ARMO's lead product candidate Pegilodocakin is currently in a Phase 3 clinical trial in pancreatic cancer, and in earlier-Phase trials in lung and renal cell cancer, melanoma and other solid tumor types.

Consolidation in Consumer Health continues

Procter & Gamble Company announced the \$4.2 billion acquisition of Merck KGaA's Consumer Health Business ("Merck"), bolstering P&G's OTC geographic scale, portfolio, and category footprint in the world's top 15 OTC markets. P&G has recently called off its health care joint venture with Teva Pharmaceutical Industries, and the acquisition of Merck potentially offers an alternative. Over the past two years, Merck has generated growth of 6% by being active across 44 countries and marketing more than 900 products.

FIGURE 4: WORLD'S TOP 15 OTC MARKETS



Source: Euromonitor

CANNABIS LEGALIZATION DRIVING M&A IN CANADA

Canada continues to defend its position within the top ranks as acquirer and target nation in M&A. Among all Canadian targeted deals approximately 40% are cannabis related, boosting M&A activity. Use of cannabis in Canada will be legalized as of October 17, 2018.

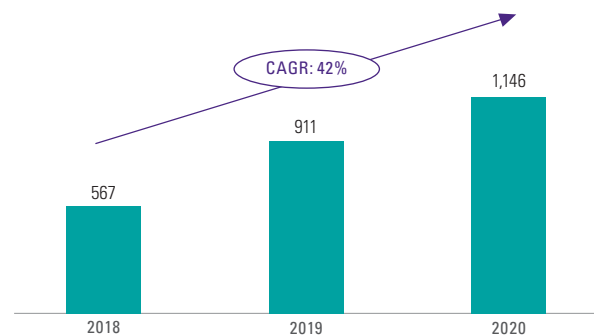
Aurora Cannabis Inc. announced the C\$3.2 billion acquisition of MedReleaf Corp., an R&D-driven Canadian company producing cannabis. The transaction will enable a platform for growth on a global scale with a total funded capacity of more than 570,000 kg cannabis per year.

Aphria Inc. has already closed the \$0.5 billion acquisition of Nuuvera Inc., a global cannabis company active in Europe, Africa and the Middle East. Cost reduction and the potential

for unlocking greater economic value from future combined production are targeted.

Hiku Brands Co. Ltd. and WeedMD Inc. have agreed upon a \$192 million merger of the two companies. The vertical integration enables control over the entire cannabis value chain and planned capacity of more than 56,000 kg by mid-2019.

FIGURE 5: ESTIMATED TOTAL MARKET SIZE OF MEDICAL MARIJUANA IN CANADA FROM 2018 TO 2020 (IN C \$ MN.)

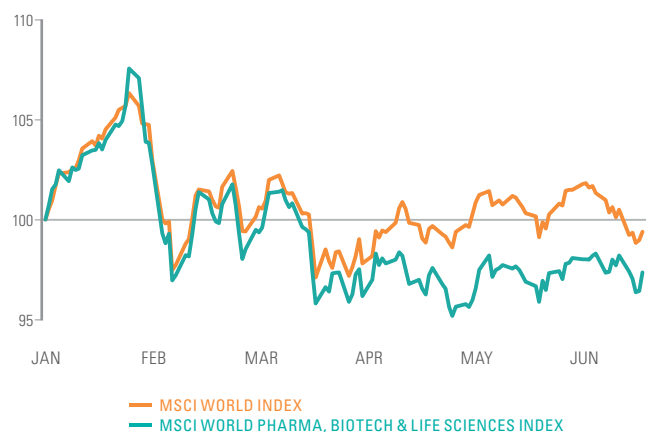


Sources: Statista, KPMG Analysis

CAPITAL INDEX

In HY1 2018, the MSCI World Pharma, Biotech and Life Sciences Index under-performed the MSCI World Index by approximately two percentage points, after holding pace during Q1 2018.

FIGURE 6: DEVELOPMENT OF LIFE SCIENCES SHARE PRICES HY1 2018



Sources: Bloomberg, KPMG Analysis

Life Sciences

The deal value of the global top 10 announced deals in HY1 2018 was

\$127.7 billion

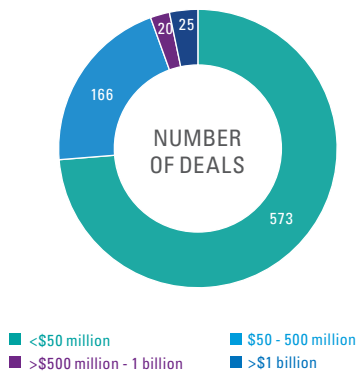
TABLE 1: GLOBAL TOP DEALS ANNOUNCED IN HY1 2018

BIDDER	TARGET	THERAPY AREA	DATE OF ANNOUNCEMENT	DEAL STATUS	TOTAL VALUE ¹
Takeda Pharmaceutical Co. Ltd.	Shire plc	Oncology, neuroscience, and gastroenterology	8 May 2018	Pending	62.3
GlaxoSmithKline plc	Consumer Healthcare Joint Venture (36.5%)	Consumer health	27 Mar 2018	Completed	13.0
Sanofi S.A.	Bioverativ Inc.	Hemophilia and blood disorders	22 Jan 2018	Completed	11.6
Celgene Corp.	Juno Therapeutics, Inc.	Blood cancer	22 Jan 2018	Completed	9.0
Novartis AG	AveXis, Inc.	Gene replacement therapy	9 Apr 2018	Completed	8.7
Celgene Corp.	Impact Biomedicines, Inc.	Hematologic malignancies	7 Jan 2018	Completed	7.0
Sanofi S.A.	Ablynx NV	Nanobodies for bleeding disorders	29 Jan 2018	Completed	4.8
Procter & Gamble Co.	Merck KGaA - Consumer Health Business	Consumer health	19 Apr 2018	Pending	4.2
Bristol-Myers Squibb Co.	Nektar Therapeutics	Immuno-oncology	14 Feb 2018	Completed	3.6
CITIC Holdings Ltd.	China Biologic Products Holdings, Inc.	Biological products, except diagnostic substances	18 Jun 2018	Pending	3.5

¹ All numbers are in US\$ billion. Financial investors are italicized. Figures in green are estimated values.

Sources: Thomson One, KPMG Analysis

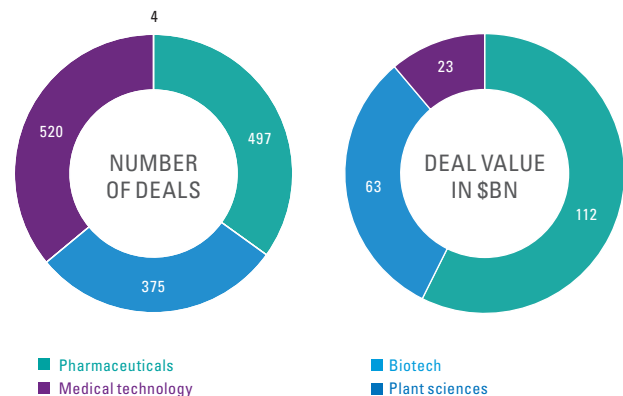
FIGURE 7: LIFE SCIENCES ANNOUNCED DEALS BY SIZE OF TRANSACTION HY1 2018*



* Includes deals with a disclosed deal value.

Sources: Thomson One, KPMG Analysis

FIGURE 8: LIFE SCIENCES ANNOUNCED DEALS BY CATEGORY HY1 2018*



* Includes all deals, with disclosed and undisclosed deal value.

Sources: Thomson One, KPMG Analysis

Chemicals

The deal value of the global top 10 announced deals in HY1 2018 was

\$27.9 billion

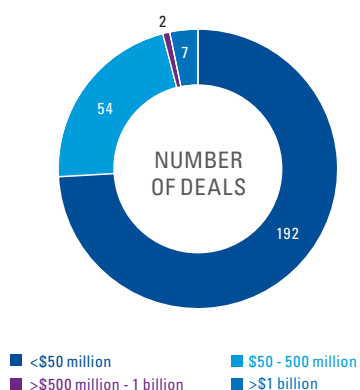
TABLE 2: GLOBAL TOP DEALS ANNOUNCED IN HY1 2018

BIDDER	TARGET	BUSINESS AREA	DATE OF ANNOUNCEMENT	DEAL STATUS	TOTAL VALUE ¹
<i>Carlyle Group LP and GIC Private Ltd.</i>	Akzo Nobel N.V. – Specialty Chemicals business	Specialty chemicals	27 Mar 2018	Pending	12.5
Tianqi Lithium Corp.	Sociedad Química y Minera de Chile S.A.	Industrial chemicals and potassium	17 May 2018	Pending	4.1
LyondellBasell Industries N.V.	A. Schulman, Inc.	High-performance plastic compounds	15 Feb 2018	Pending	2.3
BASF SE	Bayer – seeds and crop protection business	Crop science	26 Apr 2018	Pending	2.1
Shanghai Electric Group Co., Ltd.	Jiangsu Zhongneng Polysilicon Technology Development Co., Ltd.	High-performance polymers	6 Jun 2018	Pending	2.0
Compagnie Générale des Établissements Michelin SCA	Fenner PLC	Polymer technology	19 Mar 2018	Completed	1.7
Toray Industries Inc.	Koninklijke Ten Cate BV – advanced composites business	Composite and carbon fiber	14 Mar 2018	Pending	1.2
Yinbang Clad Material Co., Ltd.	Zhejiang Guxiandao Polyester Dope Dyed Yarn Co., Ltd.	High-performance polymers	28 Apr 2018	Withdrawn	0.9
Sinochem Group Co., Ltd.	Jiangsu Yangnong Chemical Group Co. Ltd.	Pesticides, chlor-alkali, fine chemical products	7 Jun 2018	Pending	0.7
<i>Shoei</i>	DIC Corp. (13.4%)	Printing ink	15 Mar 2018	Completed	0.4

¹ All numbers are in US\$ billion. Financial investors are italicized. Figures in blue are estimated values

Sources: Thomson One, KPMG Analysis

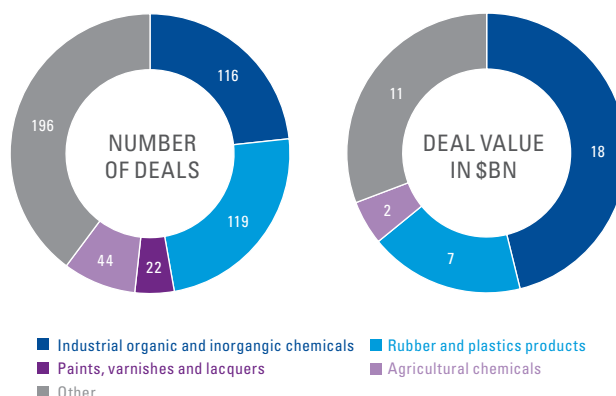
FIGURE 9: CHEMICALS ANNOUNCED DEALS BY SIZE OF TRANSACTION HY1 2018*



* Includes deals with a disclosed deal value.

Sources: Thomson One, KPMG Analysis

FIGURE 10: CHEMICALS ANNOUNCED DEALS BY CATEGORY HY1 2018*



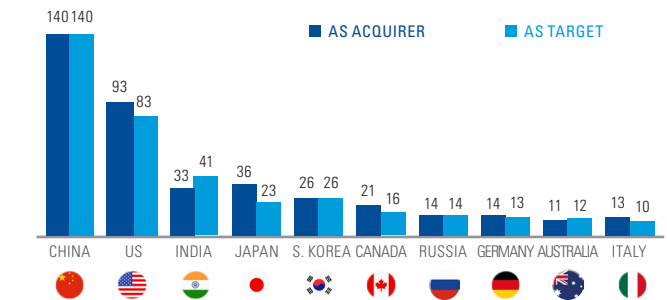
* Includes all deals, with disclosed and undisclosed deal value.

Sources: Thomson One, KPMG Analysis

Chemicals

Deal focus in chemicals M&A was widely spread across the value chain. The number of HY1 2018 announced chemical deals remained rather constant whereas the total deal value saw a decline of more than 40% compared to HY1 2017. Chemical players have started reaching out into end markets through M&A. China followed by US were the most active countries.

FIGURE 11: TOP COUNTRIES IN CHEMICALS M&A HY1 2018*



* Number of completed deals
Sources: Thomson One, KPMG Analysis

BAYER COMPLETES MONSANTO DEAL

Bayer AG completed the \$63 billion acquisition of Monsanto Co. in June 2018.

After BASF SE announced its €5.9 billion acquisition of significant parts of Bayer AG's seed and non-selective herbicide businesses, the parties have now extended the scope of the agricultural solutions businesses transaction.

BASF intends to acquire further assets for another €1.7 billion. The businesses to be sold generated total sales of €745 million in 2017.

Bayer has concluded its divestment of Covestro AG, selling a further 14.2% for €2.2 billion. Bayer now holds only 6.8% in Covestro to repay an exchangeable bond maturing in 2020.

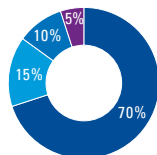
FIGURE 12: BASF SE'S ACQUISITIONS OF BAYER AG'S BUSINESSES

AGREEMENT SIGNED OCTOBER 2017

- Fully enabled seed and trait businesses
- Complementary crop protection business
- Team of professionals

~ €1.5 billion

- North America
- South America
- Asia Pacific
- Europe, Middle East, Africa



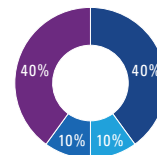
> 250 patent families

- > 1,800 employees
- 5 chemical production and formulation sites, 10 R&D sites
- Regional seed production and breeding facilities

AGREEMENT SIGNED APRIL 2018

- Global vegetable seeds business
- Seed treatment business
- R&D platform for hybrid wheat
- Digital farming platform
- Other businesses and assets
- Team of professionals

~ €745 million



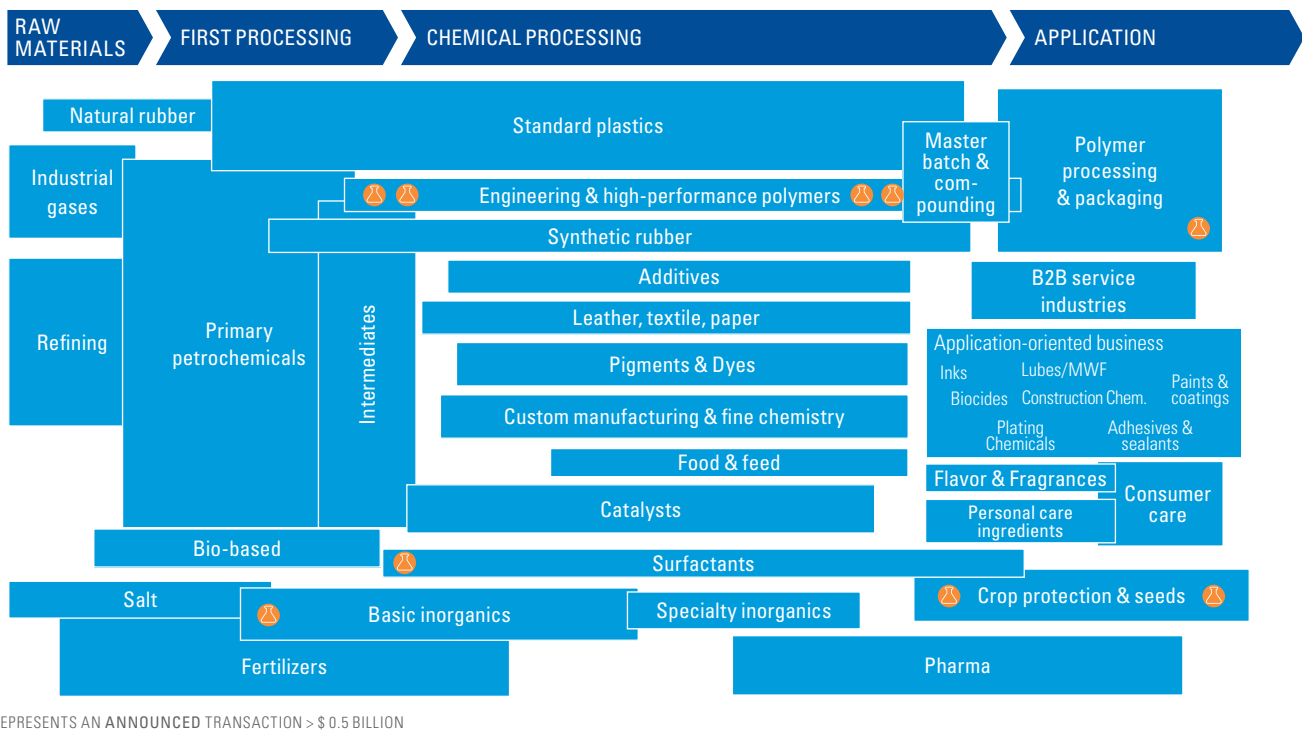
- North America
- South America
- Asia Pacific
- Europe, Middle East, Africa

> 250 patent families

- > 2,500 employees
- 7 R&D sites
- Regional seed production and breeding facilities

Source: BASF

FIGURE 13: CHEMICAL DEALS ALONG THE VALUE CHAIN IN HY1 2018



COLLABORATIONS: THINKING OUT OF THE BOX

Evonik Industries AG invests through a Series A financing round in the American skin technology start-up mySkin, Inc.. mySkin has developed a hand-held device, named OKU, which measures several properties of the skin, acting as a skin coach. The launch of OKU is planned for the last quarter of 2018.

BASF SE joins the Personalized Nutrition & Health consortium founded by The Netherlands Organization for Allied Scientific Research (TNO) and Wageningen University & Research. The consortium’s research is focused on large scale personalized nutrition and health advice. Partners across the value chain are involved, with BASF contributing its brand Newtrition. The consortium enables a platform for transforming expertise

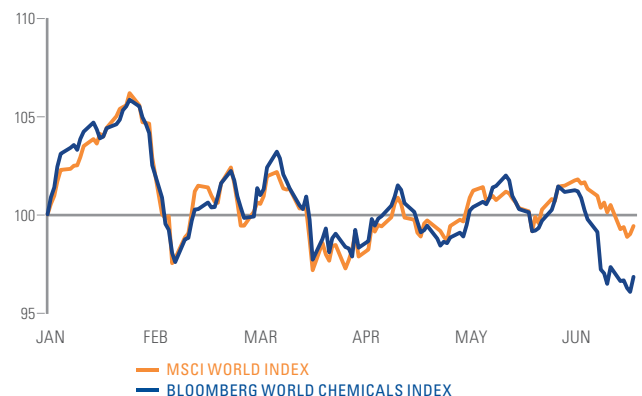
in diagnostics, digital health advice and physical product intervention into solutions for consumers.

AkzoNobel Specialty Chemicals announced the 2018 Imagine Chemistry winners of its start-up challenge. The challenge was launched to support solving real-life chemistry-related topics. Invert Robotics, which offers robotic inspection for tanks and other equipment, enabling remote inspection of non-ferromagnetic surfaces, won partner support from KPMG.

CAPITAL INDEX

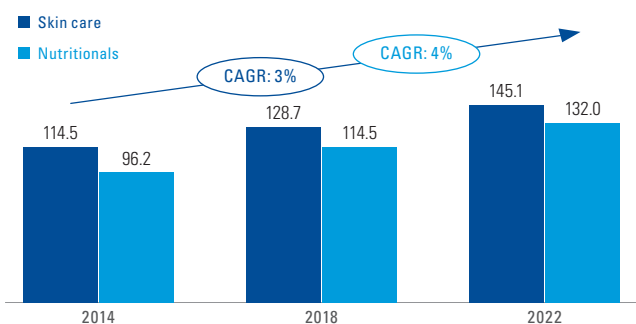
In HY1 2018 the BloombergWorld Chemicals Index tracked the MSCIWorld Index until June, when it underperformed by three percentage points.

FIGURE 15: DEVELOPMENT OF CHEMICAL SHARE PRICES HY1 2018



Sources: Bloomberg, KPMG Analysis

FIGURE 14: MARKET FOR SKIN CARE AND NUTRITIONALS IN \$ BN



Note: Nutritionals include sports nutrition, vitamins and dietary supplements; 2018 and 2022 are forecast data. Source: Euromonitor

BASIS OF DATA PREPARATION

Values and volumes used throughout the report are based on announcement date as provided by Thomson Reuters' database Thomson One as of 30 June 2018, extracted up to and including 1 July 2018, and supplemented by additional independent research. Data available after publication date is incorporated in subsequent editions. This edition presents revised data for the years 2012 to 2016. This report includes disclosed and undisclosed values for M&A transactions including minority stake purchases, acquisitions of remaining interest, and recapitalizations and it explicitly excludes self-tenders and spinoffs. The published numbers of deals and deal values are based on the analysis of target companies which operate in the following subsectors:

Life Sciences

- Medicinal chemicals & botanical products
- Pharmaceutical preparations
- In vitro and in vivo diagnostic substances
- Biotechnology – biological products, except diagnostic substances
- Pharmaceutical wholesale
- Medical devices and diagnostics
- Plant sciences

Chemicals

- Clay, kaolin, ceramic & refractory minerals
- Chemical and non-metallic mineral mining, except fuels
- Fertilizers and agricultural chemicals
- Industrial gases
- Specialty chemicals
- Chemical wholesale
- Plastics and rubber components

KPMG's Deal Thermometer is based on financial data as provided by S&P Capital IQ of public companies in the same sector as noted above with a market capitalization at quarter end of at least a \$1 billion. For the life sciences sector, this comprises 281 public companies. For the chemical sector, this comprises 194 public companies.

All figures in this report are shown in US Dollars (\$) unless otherwise stated.

Sources

Online databases:

- Thomson One (Thomson Reuters)
- Mergermarket
- S&P Capital IQ
- Bloomberg
- Evaluate Ltd.
- Various companies' press releases

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