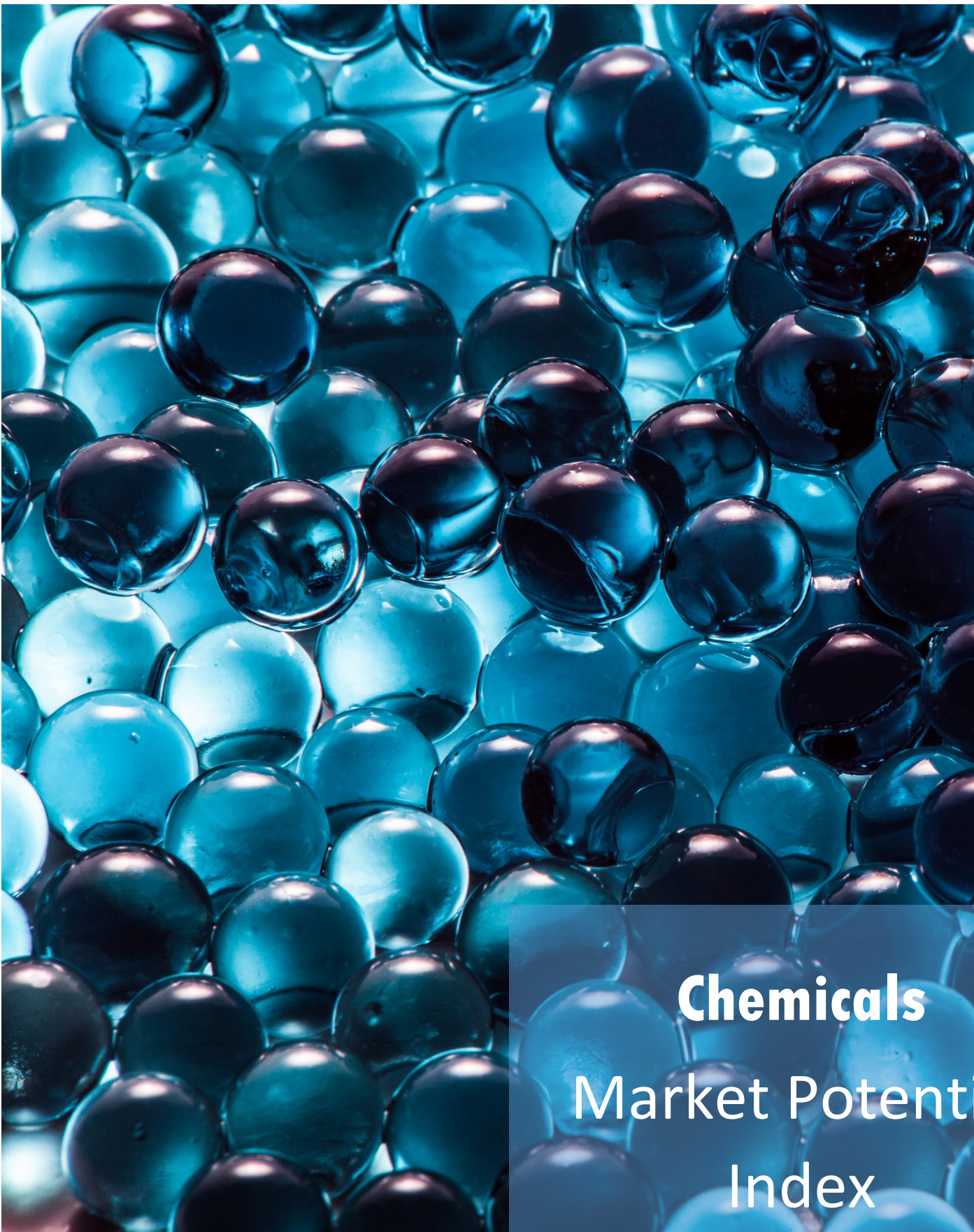


2017

Funded by the Michigan Economic Development Corporation
Conducted by the International Business Center
in the Eli Broad College of Business at Michigan State University



Chemicals Market Potential Index

Preface

The Market Potential Index (MPI) for specific industries intends to compare countries identified as having the highest Gross Domestic Product (GDP) globally based on several dimensions.

In 2016, the number of countries used for these rankings was 89, but has increased to 97 for 2017. Countries removed from the MPI rankings include Iraq, Luxembourg, Malta, Myanmar, and Papua New Guinea, while those added are Angola, Bolivia, Cameroon, the Democratic Republic of the Congo, Côte d'Ivoire, Ethiopia, Ghana, Jordan, Kenya, Lebanon, Panama, Tanzania, and Uganda.

The Index compares these 97 countries on six market dimensions: size, growth rate, capacity, openness, current logistics infrastructure, and country risk. In order to measure each of these dimensions, a different set of indicators has been identified for each industry. Secondary data that has been gathered from reputable sources is used for these indicators, as noted. The rankings of the countries are calculated by adding up the dimensions and weighing them based on relative importance.

While the MPI is a very useful tool for companies in the process of researching new markets for export, it should not be used as the single source of information in the decision. MPIs are designed to support further market research and is intended to be used for verification purposes. The information in this report can be utilized as a foundation to help identify potential countries for which more detailed research should be conducted.

The Market Potential Index is calculated with the most recent data that is available, so it is important to note that the results represent the current state of the identified 97 countries, not a forecast.

Industry specific MPIs are updated annually, and can be accessed at:

<https://globaledge.msu.edu/mpi>

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Market Overview

Asia

South Korea

South Korea experienced three years of decline for the chemicals sector until 2016, and dropped four places in the Chemicals MPI for 2017 to #9. Between these years, important companies operating in South Korea began to relocate their production facilities to lower-cost countries like Vietnam and China, which contributed to the decline. In 2016, the sector began to show evidence of recovery, spurred by an increase in production volume for key segments.

The segment of hydrocarbons, oxygen-function compounds, and other organic chemicals account for roughly 80% of the total market size in the country, and reported growth of 4.3% in 2016. In addition, South Korea is also one of the largest lithium-battery producers in the world, which creates high demand for lithium carbonate. Production volume of these batteries increased by 23% in 2016.¹

India

Robust sector growth has contributed to India increasing ten places in the Chemicals MPI ranking for 2017, to #19. In 2012, the Indian government proposed the National Chemical Policy (NCP), which aims to consolidate regulations as well as increase safety. The chemicals industry has been subject to regulation by 15 acts and 19 rules, which has made production and doing business difficult and complex for companies in the country, especially with the considerable growth that India is experiencing. The streamlining of the 15 acts and 19 rules that govern the chemicals industry will decrease obstacles for businesses operating in India, making the country more welcoming to investment.²

To keep up with growing domestic demand spurred from the Indian government's investment allowance programs, investment in production capacity has been accelerating. In 2016, the state-owned Gas Authority of India Ltd. Invested into doubling their production capacity of ethylene to 900,000 tons per year. ONGC Petro Additions Ltd. also started developing a petrochemical complex that will have an annual production capacity of 1.1 million tons of ethylene and 400,000 tons of propylene building blocks.³

Singapore

For the Chemicals MPI ranking, Singapore decreased six places from #4 in 2016 to #10 in 2017. Trouble within the country's petrochemical segment has taken a toll on regional

¹ Passport GMID: [Basic Chemicals in South Korea](#)

² Passport GMID: [Basic Chemicals in India](#)

³ Passport GMID: [Basic Chemicals in India](#)

hydrocarbon prices. In September of 2016, Royal Dutch Shell declared force majeure on the production of basic chemicals from its ethylene cracker facility in Bukom, which is Shell's largest wholly owned plant.⁴ A few months later in January of 2017, two more incidents occurred within two days of each other. ExxonMobil's chemical plant on Jurong Island caught fire, followed by a chemical leak at Shell's same site that was shut down in September.⁵

North America

Canada

The chemical industry in Canada is conducted in a similar manner to many other countries, where chemicals act as key inputs to add value to raw resources for other important sectors; including plastic and rubber products, transportation equipment, clothing, agriculture, and many more. For the 2017 Chemicals MPI, Canada increased five places to #4.

Canada imports more chemicals and chemical products than it exports, although this gap is narrowing throughout the years, with exports increasing and imports decreasing. The country's top trading partner is the United States, which accounted for 78% of their exports and 62% of their imports for chemicals and chemical products in 2016. This highly intertwined trade partnership that Canada shares with the United States is precarious following the renegotiation plans of the North American Free Trade Agreement (NAFTA) including Canada, Mexico, and the United States.⁶

Mexico

Mexico decreased seven places to rest at #21 for the 2017 Chemicals MPI ranking. The decreasing prices of oil in 2015 had lasting effects on the chemical industry, considering that hydrocarbons and other chemicals are important raw materials for the production of plastics. A positive development for the industry despite fluctuating global prices is the completion of the Ethylene XXI petrochemicals facility in mid-2016, furnished through a joint venture between Brazilian and Mexican chemical companies.⁷ This facility includes a 1.05 million ton per year ethane cracker, will produce 750,000 tons per year of high density of polyethylene and 300,000 tons per year of low density polyethylene once at full capacity. Ethylene XXI will serve as the largest completed petrochemicals complex in the region, and will aid the expected increase in demand for polyethylene.⁸

⁴ Reuters: [Shell Declares Force Majeure on Chemical Supply from Singapore](#)

⁵ Channel NewsAsia: [Chemical Leak Hits Shell Facility, Fire at ExxonMobil Plant in Separate Incidents](#)

⁶ Chemical Industry Association of Canada: [Chemistry Industry Economic Profile 2017](#)

⁷ Passport GMID: [Basic Chemicals in Mexico](#)

⁸ Independent Chemical Information Service: [Braskem Idesa Inaugurates Mexico Ethylene XXI PE Complex](#)

Europe

Ireland

Ireland exhibited one of the largest changes for the Chemicals MPI ranking in 2017, jumping sixteen places from #21 to #5. The rapid growth began in 2014, when the Net Selling Value (NSV) of products manufactured and sold by Irish firms increased by 13.9%. Chemicals and chemical products accounted for some of the most significant increases in NSV, with an annual increase of 31.5% for the sector.⁹

A positive discovery for the chemicals industry in Ireland, especially the petrochemical sector, has been the identification of possible oil fields in the Irish Sea. These fields have untapped potential equivalent to more than 1 billion barrels of oil, according to the exploration company. Since the petrochemicals sector within the industry feels the effects of changing oil prices and most of the requirements are met through imports from other countries, developing their own domestic supply of oil would allow for cost consistency for raw material inputs.¹⁰

Germany

Although Germany decreased one place from 2016 to 2017, the country is still highly ranked at #3 out of 97 countries. Despite the decrease, production showed positive growth since 2015 that can be attributed to an expansion in volume output. Some of the largest chemical companies in the world produce their basic chemicals in Germany, including Dow Chemical Co. and BASF SE. Dow increased production at their facility in Bomlitz to include methyl cellulose with a capacity of 750,000 tons per year. BASF SE also increased production at their Ludwigshafen facility in 2015 to 3.4 million tons. The heightened volume was able to compensate for falling prices in the industry, and overcame them by 5%.¹¹

In 2007, the European Union passed legislation to regulate the chemical industry within the trade bloc. It created the European Chemicals Agency (ECHA), as well as the Regulation for Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH). Three phases of deadlines for the registration of different amounts of chemicals were announced, including one in each 2010 and 2013, as well as a final in 2018.¹² The registration window that a company needed to comply with depended on the type of the substance that needed to be registered, as well as the volume of the substance. The last registration date in 2018 is for substances with volumes between one and one hundred tons a year.¹³ It has been reported that the required registration

⁹ Central Statistics Office: [Irish Industrial Production by Sector](#)

¹⁰ Passport GMID: [Ireland-Country Profile](#)

¹¹ Passport GMID: [Basic Chemicals in Germany](#)

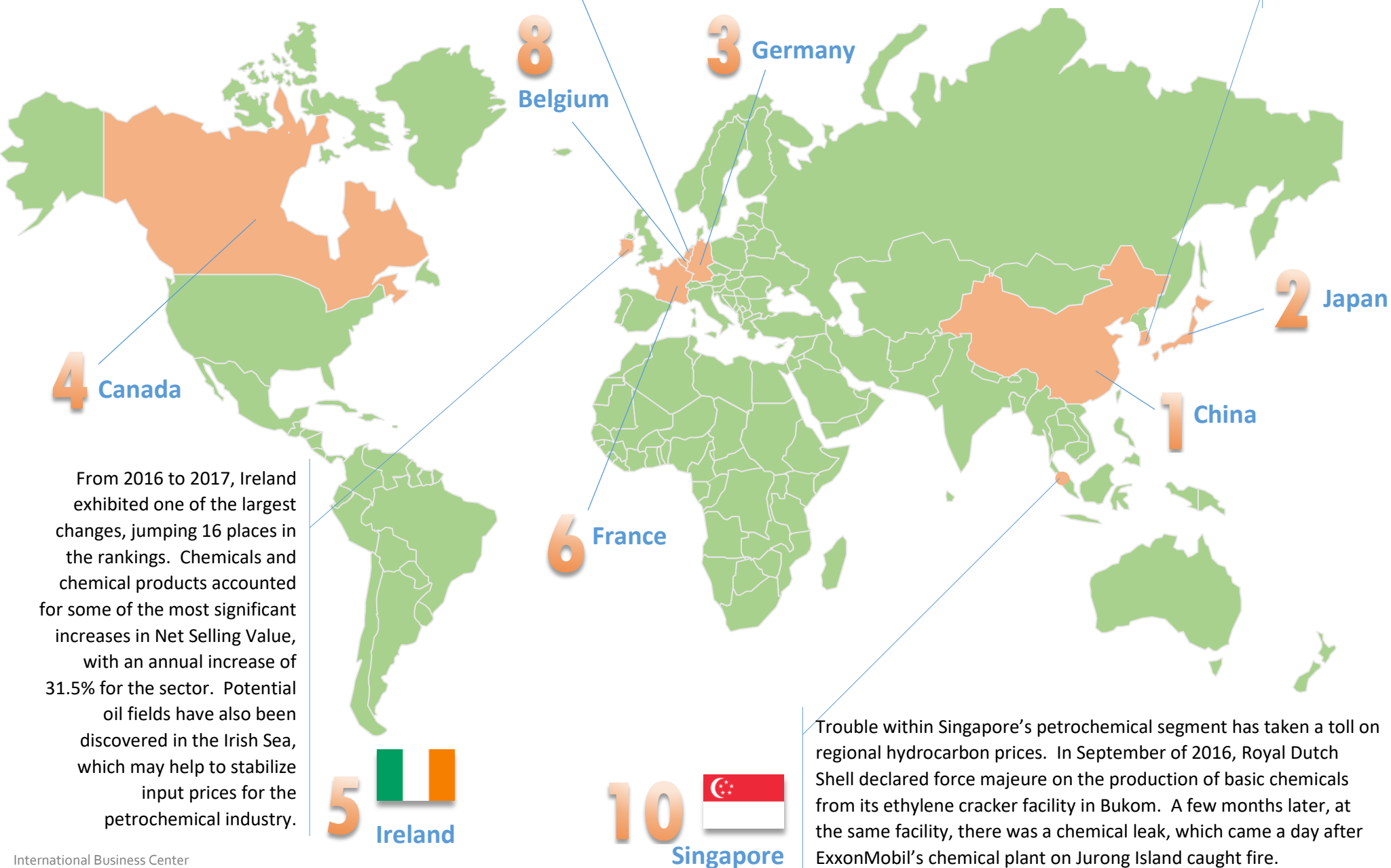
¹² Chemical Inspection and Regulation Service: [REACH Registration Deadlines](#)

¹³ European Chemicals Agency: [REACH Registration](#)

of substances in this range may have negative effects on countries with strong chemical industries, including Germany. Some companies in the EU may move production of their chemicals to other locations outside of the EU in order to avoid registration costs, which has the potential to negatively affect the demand of the chemical industry.¹⁴

¹⁴ Passport GMID: [Basic Chemicals in Germany](#)

2017 CHEMICALS Top 10 Markets



Important chemical companies operating in South Korea began to relocate their production facilities to lower-cost countries like Vietnam and China, which led to a three year decline until 2016. South Korea is one of the largest lithium-battery producers in the world, which has created high demand for lithium carbonate. These increased production volumes in key subsectors has spurred moderate recovery of the industry, which reported growth of 4.3% for 2016.

From 2016 to 2017, Ireland exhibited one of the largest changes, jumping 16 places in the rankings. Chemicals and chemical products accounted for some of the most significant increases in Net Selling Value, with an annual increase of 31.5% for the sector. Potential oil fields have also been discovered in the Irish Sea, which may help to stabilize input prices for the petrochemical industry.

Trouble within Singapore's petrochemical segment has taken a toll on regional hydrocarbon prices. In September of 2016, Royal Dutch Shell declared force majeure on the production of basic chemicals from its ethylene cracker facility in Bukom. A few months later, at the same facility, there was a chemical leak, which came a day after ExxonMobil's chemical plant on Jurong Island caught fire.

Results of the 2017 Chemicals MPI

	OVERALL	Market Size (30/100)	Market Growth Rate (15/100)	Market Capacity (10/100)	Market Openness (15/100)	Logistics Infrastructure (15/100)	Country Risk (15/100)
	RANK	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX
China	1	100	29	100	55	78	60
Japan	2	46	18	84	78	67	92
Germany	3	45	22	46	72	89	94
Canada	4	14	27	49	100	84	88
Ireland	5	6	79	75	75	59	86
France	6	22	17	54	74	79	88
Netherlands	7	14	21	51	79	100	92
Belgium	8	18	24	21	75	92	89
Korea, Rep.	9	23	23	39	67	71	79
Singapore	10	8	34	46	89	81	88
United Kingdom	11	16	12	44	77	89	87
Israel	12	3	100	28	73	43	78
Switzerland	13	9	22	74	70	68	100
Hong Kong	14	4	21	68	85	77	84
Spain	15	14	23	26	70	80	77
Italy	16	19	16	27	67	61	77
Denmark	17	4	40	31	72	73	91
Austria	18	7	26	27	77	62	94
India	19	23	37	18	55	36	57
Sweden	20	6	11	35	73	78	96
Mexico	21	14	29	15	87	57	51
Norway	22	4	15	40	81	56	97
United Arab E.	23	5	41	27	66	72	69
Australia	24	7	17	38	77	35	91
Finland	25	4	12	29	77	66	90
Malaysia	26	7	33	10	75	56	69
Czech Republic	27	5	30	12	71	49	85
Poland	28	8	35	14	61	49	76
New Zealand	29	3	22	22	82	34	93
Portugal	30	4	21	13	71	62	77
Estonia	31	2	26	12	73	48	86
Lithuania	32	2	33	10	75	47	73
Chile	33	3	23	16	74	47	76
Latvia	34	2	32	10	76	44	75

	OVERALL	Market Size (30/100)	Market Growth Rate (15/100)	Market Capacity (10/100)	Market Openness (15/100)	Logistics Infrastructure (15/100)	Country Risk (15/100)
	RANK	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX
<i>Slovakia</i>	35	3	34	12	69	36	78
<i>Saudi Arabia</i>	36	7	40	15	56	44	60
<i>Qatar</i>	37	3	41	33	54	42	67
<i>Turkey</i>	38	10	33	12	56	48	44
<i>Hungary</i>	39	4	32	9	68	40	67
<i>Slovenia</i>	40	2	22	14	66	48	76
<i>Thailand</i>	41	9	26	8	67	30	54
<i>Brazil</i>	42	16	12	38	50	30	39
<i>Indonesia</i>	43	12	31	10	58	9	54
<i>Colombia</i>	44	4	25	9	74	41	51
<i>Vietnam</i>	45	5	50	7	60	28	43
<i>Dominican Rep.</i>	46	2	33	6	80	45	42
<i>Bahrain</i>	47	2	39	14	65	42	48
<i>Russia</i>	48	12	26	24	50	30	39
<i>Costa Rica</i>	49	2	30	10	75	28	59
<i>Philippines</i>	50	5	48	7	61	6	58
<i>Peru</i>	51	3	27	8	70	37	57
<i>Panama</i>	52	2	1	12	75	77	58
<i>Morocco</i>	53	3	29	5	62	49	57
<i>Romania</i>	54	4	30	9	65	29	59
<i>Bulgaria</i>	55	2	44	7	59	23	58
<i>Cote d'Ivoire</i>	56	2	70	2	52	35	28
<i>El Salvador</i>	57	2	34	4	74	36	43
<i>South Africa</i>	58	5	21	7	62	43	49
<i>Kuwait</i>	59	2	32	18	55	24	61
<i>Croatia</i>	60	2	19	9	75	43	46
<i>Guatemala</i>	61	2	35	4	69	35	41
<i>Oman</i>	62	1	26	10	63	40	55
<i>Cyprus</i>	63	1	17	13	64	31	65
<i>Greece</i>	64	3	13	13	66	47	50
<i>Cambodia</i>	65	2	74	2	49	4	29
<i>Uruguay</i>	66	2	16	12	56	40	59
<i>Ecuador</i>	67	2	25	6	70	47	27
<i>Honduras</i>	68	2	24	3	73	38	35
<i>Jordan</i>	69	1	29	4	73	29	39
<i>Nicaragua</i>	70	2	48	2	63	23	24

	OVERALL	Market Size (30/100)	Market Growth Rate (15/100)	Market Capacity (10/100)	Market Openness (15/100)	Logistics Infrastructure (15/100)	Country Risk (15/100)
	RANK	INDEX	INDEX	INDEX	INDEX	INDEX	INDEX
<i>Kenya</i>	71	2	38	4	57	26	38
<i>Ethiopia</i>	72	2	87	2	33	1	20
<i>Sri Lanka</i>	73	2	27	4	62	24	38
<i>Bolivia</i>	74	2	46	3	59	4	34
<i>Azerbaijan</i>	75	2	40	6	53	21	30
<i>Uganda</i>	76	1	46	1	58	7	28
<i>Serbia</i>	77	2	21	5	65	17	38
<i>Belarus</i>	78	2	40	6	64	22	7
<i>Kazakhstan</i>	79	2	21	8	69	12	31
<i>Paraguay</i>	80	2	34	3	55	18	32
<i>Tunisia</i>	81	2	21	5	59	17	40
<i>Egypt</i>	82	3	24	6	37	45	25
<i>Lebanon</i>	83	2	32	7	51	26	20
<i>Argentina</i>	84	5	10	12	43	32	32
<i>Bangladesh</i>	85	3	48	4	31	7	28
<i>Tanzania</i>	86	2	40	2	43	12	30
<i>Algeria</i>	87	3	34	5	31	18	39
<i>Nigeria</i>	88	3	48	5	33	15	15
<i>Cuba</i>	89	3	29	6		34	1
<i>Pakistan</i>	90	4	31	2	30	26	21
<i>Ukraine</i>	91	3	7	5	59	24	12
<i>Ghana</i>	92	2	7	3	44	20	36
<i>Angola</i>	93	2	29	7	38	4	16
<i>Cameroon</i>	94	2	33	2	19	6	27
<i>Uzbekistan</i>	95			4	59	6	16
<i>Venezuela</i>	96	4	9	5	38	18	1
<i>Congo, Dem. Rep.</i>	97	1	54	1	1	4	9

* **Overall Rank** is calculated by weighting the six dimension values. For **Index** values, values of the countries are converted into a 1-100 scale based on their relative magnitudes in each of the six dimensions. An index value of 100 indicates a country with the largest (or most favorable) value in a dimension whereas an index value of 1 indicates the smallest (or least favorable). While both the overall rank and index values show the rank order of the countries, the index values also indicate the magnitude of each country in relation to others in that order.

Assumptions

Chemicals are widely used in almost every industry around the world. Because of the industry's large scope, the total value of manufacturing production of countries is considered to be a good indicator of the market size for the chemicals industry. On the other hand, consumption values of all chemical products are used as an indicator of the market size. Since the consumption values are not readily available as secondary data, they are calculated by subtracting the chemical products exports from the total of chemical production and imports.

Since pharmaceuticals are covered in the biosciences MPI, they are excluded from the trade value calculations of chemicals. Items under HS code chapter 36 (explosives, matches, etc.) and items under HS code chapter 37 (photographic items etc.) are also excluded.

Trade and tariff data for the following Harmonized System (HS) codes are used for the measurement of the market openness dimension as well as other generic export-related indicators. As a final note, the market growth rate is measured by calculating the Compounded Annual Growth Rate (CAGR) of each market size indicator for the last 5 years.

<i>HS7 Code</i>	<i>DEFINITION</i>
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals of radioactive elements or of isotopes
29	Organic chemicals
31	Fertilizers
32	Tanning or dyeing extracts; dyes, pigments, paints, varnishes, putty and mastics
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations
34	Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modeling pastes, "dental waxes" and dental preparations with a basis of plaster
35	Albuminoidal substances; modified starches; glues; enzymes
38	Miscellaneous chemical products

Indicators & Resources

<i>Dimension</i>	<i>Weight</i>	<i>Measures Used</i>
<i>Market Size</i>	30	- Consumption of Chemicals = [Production + Imports] - Exports (2016)^{1,2} - Manufacturing, Value Added (2016)³

		Value of Total Chemicals Imports (2016)²
<i>Market Growth Rate</i>	15	- CAGR of Consumption of Chemicals (2011-2016)^{1,2} - CAGR of Manufacturing, Value Added (2011-2016)³ - CAGR of Value of Total Chemicals Imports (2011-2016)²
<i>Market Capacity</i>	10	- Foreign Direct Investment, Net Inflows (2015)³ - GNI Per Capita (2016)¹ - R&D Expenditure (2016)¹
<i>Market Openness</i>	15	- Applied Tariff Rate on Chemicals (2016)⁴ - Burden of Customs Procedure (2016)³ - Cost to Import, Border Compliance (2016)³ - Cost to Import, Documentary Compliance (2016)³ - Imports of Chemicals from the US as a Share of Global Imports (2016)²
<i>Logistics Infrastructure</i>	15	- Distance of Country from US⁵ - Liner Shipping Connectivity Index (2016)³ - Logistics Performance Index (2016)³ - Quality of Port Infrastructure Index (2016)³
<i>Country Risk</i>	15	- Business Risk Rating (2016)⁶ - Economic Risk Rating (2016)⁷ - Intellectual Property Rights Protection (2017)⁸ - Political Risk Rating (2016)⁹

Data used are those available for most recent year. All sources were accessed in May-June 2017.

¹Passport GMID, [Global Market Information Database](#)

²UN Comtrade, [Commodity Trade Statistics Database](#)

³World Bank, [World Development Indicators](#)

⁴World Trade Organization (WTO), [Tariff Database](#)

⁵Happyzebra, [Distances](#)

⁶Swiss Export Risk Insurance, [Cover Practice for Countries and Banks](#)

⁷Coface, [Economic Studies](#)

⁸International Property Rights Index, [2016 IPRI Report](#)

⁹Credendo, [Country Risk Ratings](#)

Year To Year Comparison

Country	RANK		
	2017	2016	2014
China	1	1	1
Japan	2	3	3
Germany	3	2	2
Canada	4	9	5
Ireland	5	21	31
France	6	7	6
Netherlands	7	6	12
Belgium	8	8	7
Korea, Rep.	9	5	4
Singapore	10	4	9
United Kingdom	11	12	10
Israel	12	33	19
Switzerland	13	10	8
Hong Kong SAR, China	14	13	11
Spain	15	20	24
Italy	16	23	21
Denmark	17	19	28
Austria	18	16	20
India	19	29	27
Sweden	20	17	16
Mexico	21	14	15
Norway	22	15	34
United Arab Emirates	23	11	23
Australia	24	24	18
Finland	25	39	22
Malaysia	26	22	25
Czech Republic	27	37	38
Poland	28	28	51
New Zealand	29	26	17
Portugal	30	36	41
Estonia	31	32	36
Lithuania	32	40	52
Chile	33	30	32
Latvia	34	51	58
Slovakia	35	47	46
Saudi Arabia	36	27	30
Qatar	37	18	14
Turkey	38	35	50
Hungary	39	52	53
Slovenia	40	48	45
Thailand	41	49	44
Brazil	42	38	26
Indonesia	43	34	40
Colombia	44	61	48
Vietnam	45	45	69
Dominican Republic	46	67	37
Bahrain	47	56	63
Russian Federation	48	46	35
Costa Rica	49	43	47

Country	RANK		
	2017	2016	2014
Philippines	50	50	71
Peru	51	41	39
Panama	52		
Morocco	53	42	49
Romania	54	58	56
Bulgaria	55	59	74
Cote d'Ivoire	56		
El Salvador	57	66	54
South Africa	58	54	62
Kuwait	59	44	29
Croatia	60	62	73
Guatemala	61	53	57
Oman	62	57	13
Cyprus	63	68	72
Greece	64	73	65
Cambodia	65	55	82
Uruguay	66	60	55
Ecuador	67	78	66
Honduras	68	64	60
Jordan	69		
Nicaragua	70	69	64
Kenya	71		
Ethiopia	72		
Sri Lanka	73	63	68
Bolivia	74		
Azerbaijan	75	76	80
Uganda	76		
Serbia	77	75	75
Belarus	78	85	76
Kazakhstan	79	79	87
Paraguay	80	71	67
Tunisia	81	82	84
Egypt, Arab Rep.	82	65	59
Lebanon	83		
Argentina	84	77	77
Bangladesh	85	72	81
Tanzania	86		
Algeria	87	74	70
Nigeria	88	70	83
Cuba	89	84	86
Pakistan	90	80	79
Ukraine	91	83	78
Ghana	92		
Angola	93		
Cameroon	94		
Uzbekistan	95	89	89
Venezuela	96	88	61
Congo, Dem. Rep.	97		

For More Information

For the indexing methodology, please refer to:

"Measuring the Potential of Emerging Markets: An Indexing Approach" - S. Tamer Cavusgil,
[Business Horizons, January-February 1997, Vol. 40 Number 1, 87-91](#)

"Complementary Approaches to Preliminary Foreign Market Opportunity Assessment: Country Clustering and Country Ranking" - S. Tamer Cavusgil, Tunga Kiyak and Sengun Yeniyurt,
[Industrial Marketing Management, October 2004, Volume 33, Issue 7, 607-617](#)