

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



Advanced Manufacturing 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

Asian countries, including China, India, and South Korea, have consistently emerged as important markets to follow within the advanced manufacturing sector. For both 2016 and 2017, China has remained the number one country. Competition between the United States and China in the region has grown, especially following the withdrawal of the United States from the Trans-Pacific Partnership (TPP). The TPP includes countries equating to roughly 40% of the world's economy, such as Japan, Malaysia, Australia, New Zealand, Canada, Mexico, and formerly the United States.

China was specifically not included in the agreement, as an attempt to lessen their influence in the region, with the intent of placing the United States in a position of trade leadership throughout Asia.¹ In the absence created by the withdrawal of the United States, China has moved to fill the economic power vacuum in order to edge out them and maintain their place as a competitive manufacturing and trade hegemon.

While the Obama Administration's negotiations of the TPP imposed US-backed labor along with environmental and patent protections, China's renegotiations and future trade deals are unlikely to address those aspects. This will allow Chinese corporations to manufacture cheaper goods, increasing the potential for them to be more competitive in the global market.²

That being said, the manufacturing sector of China has slowed down at a much faster rate than previously expected for the first half of 2017. This contraction of the industry follows efforts made by policymakers to reduce financial risks in the economy, which in turn weighed on demand.³

The United States, China, and South Korea were also involved in a dispute regarding the Terminal High Altitude Area Defense system (THAAD). The government of South Korea, in partnership with the United States, planned to deploy the anti-missile defense system in order to add another layer of protection following the recent military aggression displayed by North Korea.⁴ China, however, expressed great concern over this agreement, fearing it would be used by both the United States and South Korea to spy on their defense and nuclear deterrent systems.

This effectively deteriorated the relationship between the two countries, and led to serious economic implications for South Korea. Boycotts were called for of South Korean goods, as well as an alleged unofficial tourism boycott by Chinese tour agencies. Manufacturing firms in South Korea trade heavily with China, and have experienced nine months of contraction previous to April 2017. This can be attributed to export

¹ *BBC News*: <http://www.bbc.com/news/world-us-canada-38721056>

² *CNN Politics*: <http://www.cnn.com/2017/01/23/politics/trump-tpp-things-to-know/index.html>

³ *CNBC*: <http://www.cnbc.com/2017/04/30/china-april-manufacturing-growth-slows-faster-than-expected.html>

⁴ *BBC News*: <http://www.bbc.com/news/world-asia-39883804>

orders declining from China amid these geopolitical tensions.⁵ From 2016 to 2017, South Korea decreased eight places in the rankings.

The implementation of THAAD was solidified under the previous South Korean President, Park Guen-hye, and hurried along in order to be declared operational prior to the affirmation of the current President Moon Jae-in. Due to the effects of the unofficial sanctions by China, President Jae-in has delayed the deployment of the missile defense system as of June 2017. This choice will hopefully begin to repair relations between China and South Korea in political and economic matters and lead to a better trade environment for manufacturing in South Korea.⁶

Similarly to South Korea, India fell nine places in the ranking for 2017, although it is still considered the fastest growing economy out of the G20 countries, with growth of about 7.5% consistently. The acceleration of structural reforms, movement towards a rule-based policy framework, and low commodity prices have bolstered this growth.

Recent deregulation measures and efforts to improve the ease of doing business in the country, like the “Make in India” program, have also worked to boost foreign investment in key industries, including manufacturing.⁷ The program has shown success in the years since its’ inception, but the economy and manufacturing industry is still greatly limited by the relatively high corporate income tax rates, slow land acquisition processes, regulations which remain stringent in some areas, weak corporate balance sheets, high non-performing loans which weigh on banks’ lending, and infrastructure bottlenecks. Complex labor laws have also kept job creation in the formal sectors low.⁸ These factors collectively led to the fall in the ranking of India in comparison to the other 96 countries, despite the growing economy.

Europe

The developed nations of Europe may not have the largest markets or highest rankings, but have shown impressive growth within the past year. Ireland has proven to be economically successful despite the United Kingdom’s vote to leave the European Union (Brexit) in 2016, and emerged as the fastest growing economy in the EU. They were previously expected to be the member country that would be the most adversely effected by the Brexit decision due to their close trading partnership and proximity to the United Kingdom, but the impacts have been minimized and the economic growth forecasts have been raised for 2017 and 2018 by the Irish government.⁹

Manufacturing activity has grown rapidly in the first half of 2017, following new export orders being placed at the fastest pace in nearly two years. The manufacturing sector in

⁵ *Financial Times*: <https://www.ft.com/content/06e26e3e-fb78-371c-8fb9-c18ba78bb687>

⁶ *CNN News*: <http://www.cnn.com/2017/06/07/asia/south-korea-thaad-suspended/index.html>

⁷ *Market Realist*: <http://marketrealist.com/2017/05/are-prime-minister-modis-reforms-boosting-fdi-in-india-in-2017/>

⁸ OECD (2017), OECD Economic Surveys: India 2017, OECD Publishing, Paris. http://dx.doi.org/10.1787/eco_surveys-ind-2017-en

⁹ *Reuters*: <http://www.reuters.com/article/us-ireland-economy-pmi-idUSKBN17Y0DX>

Ireland is also larger than most other EU members, accounting for 40.5% of the GDP and employing 11.8% of the workforce. Low standard rates of corporation tax on manufacturing also encourage growth and investment into this sector in Ireland.¹⁰ This positive growth and success of their economy and manufacturing sector has led them to increase 15 spots to #12 on the rankings from 2016 to 2017.

Italy, like Ireland, has also shown a large increase in their ranking, increasing 13 places in 2017, since beginning to recover after a deep and long recession. In order to spur more industrial growth, the Italian government launched the National Industry 4.0 Plan, which provides incentives equivalent to nearly 14.63 billion USD. This is the first national industry plan implemented in Italy that is explicitly aimed at modernizing the productive structure of the economy; focusing on boosting innovation and skills in new technologies for manufacturing. Similar plans have been implemented successfully in other countries, like Industrie du Futur in France, Industrie 4.0 in Germany, and Manufacturing USA in the United States.

To boost investment over the coming years to 2020, the Italian government has allowed for depreciation opportunities that offer large deductions on taxes. Research and development tax credits have also been strengthened, as well as an increase in the annual tax-credit ceiling from 5.63 million USD to 22.5 million USD.

In order to focus on the enhancement of skills and education, information and communications technology (ICT) will be implemented into all schools. Italy also hopes to increase the number of students and doctoral researchers in technical and scientific subjects.¹¹ The implementation of the National Industry 4.0 Plan will encourage the development of their manufacturing sector over the coming years, and most likely will be helpful to other EU countries following their success.

North America

The manufacturing industries in both Mexico and Canada have felt the effects of the uncertainty surrounding the United States' and the North American Free Trade Agreement (NAFTA). The Canadian and Mexican governments have pushed for a renegotiation of NAFTA instead of its' outright termination, which was originally threatened by the United States. An agreement to renegotiate has been reached by all parties, but the United States continues to maintain that if the negotiations do not achieve an outcome that is satisfactory to his administration, they will still be prepared to withdraw from the agreement.

¹⁰ *Passport GMID (Global Market Information Database)*:
<http://www.portal.euromonitor.com.proxy2.cl.msu.edu/portal/analysis/related>

¹¹ OECD (2017), *OECD Economic Surveys: Italy 2017*, OECD Publishing, Paris.
DOI: http://dx.doi.org/10.1787/eco_surveys-ita-2017-en

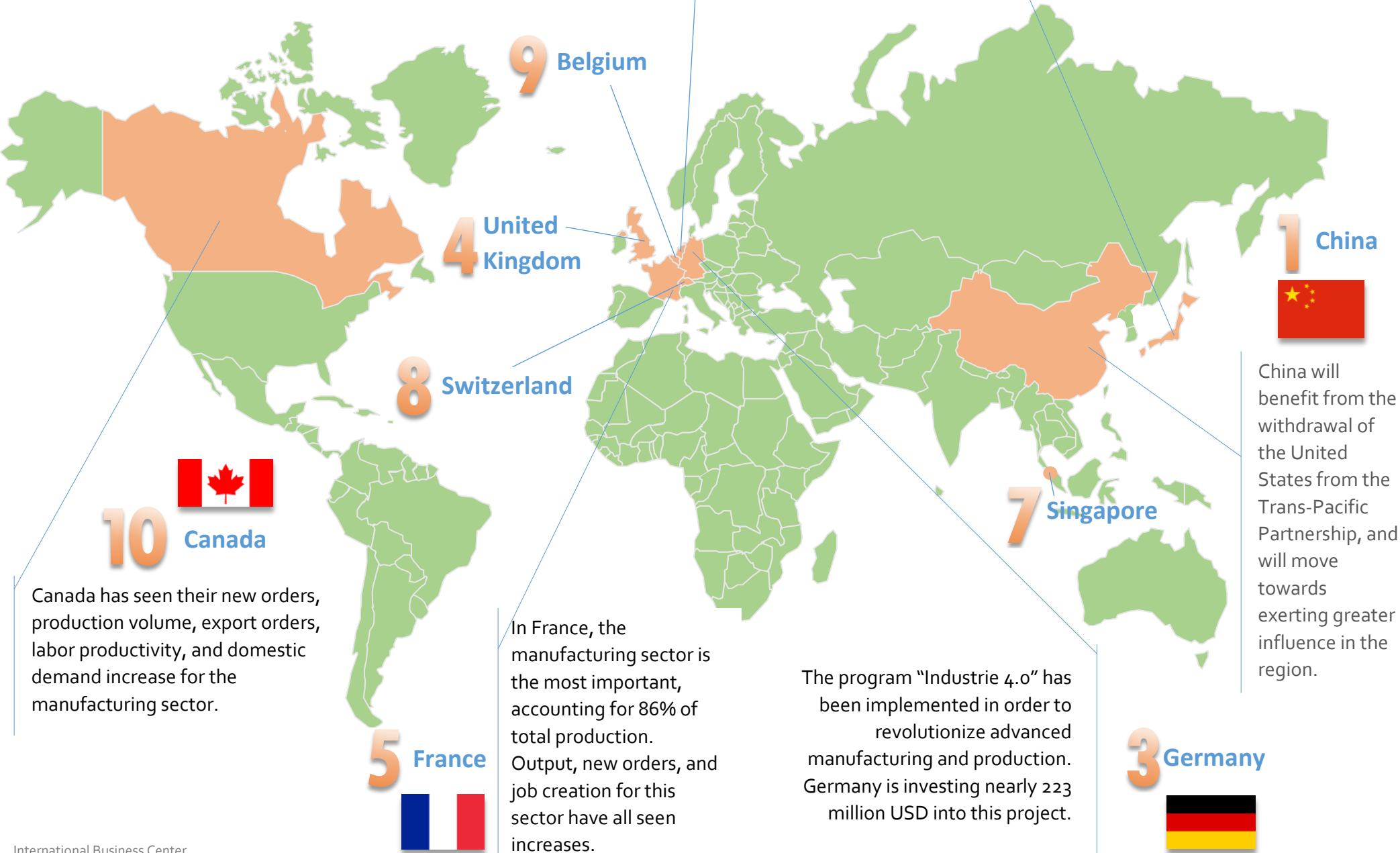
Mexico's manufacturing activity slowed in April of 2017, which can be attributed to weaker demand conditions stemming from the currently strained trade relationship with the United States.¹² They dropped 9 places in the rankings.

Despite the trade uncertainty with the United States as well, Canada has seen their new orders, production volume, export orders, labor productivity, and domestic demand all increase for the manufacturing sector.¹³ While Canada has moved down 4 rankings since 2016, they are still one of the top identified countries for advanced manufacturing at #10 out of 97 in 2017.

¹² *Market Realist*: <http://marketrealist.com/2017/05/why-mexicos-manufacturing-activity-is-decelerating/>

¹³ *Market Realist*: <http://marketrealist.com/2017/05/canadas-manufacturing-pmi-6-year-high-improving-business-climate/>

2017 ADVANCED MANUFACTURING Top 10 Markets

Japan has experienced ten straight months of expansion in the manufacturing sector as of May 2017. Growth is expected to continue, coinciding with preparations for the 2020 Olympics in Tokyo.

China will benefit from the withdrawal of the United States from the Trans-Pacific Partnership, and will move towards exerting greater influence in the region.

The program "Industrie 4.0" has been implemented in order to revolutionize advanced manufacturing and production. Germany is investing nearly 223 million USD into this project.

In France, the manufacturing sector is the most important, accounting for 86% of total production. Output, new orders, and job creation for this sector have all seen increases.

Canada has seen their new orders, production volume, export orders, labor productivity, and domestic demand increase for the manufacturing sector.

Results of the 2017 Advanced Manufacturing 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	53	84	74	78	60
Japan	2	31	51	100	87	67	92
Germany	3	26	51	40	92	89	94
United Kingdom	4	20	60	44	96	89	87
France	5	19	54	46	93	79	88
Netherlands	6	15	54	38	97	100	92
Singapore	7	16	54	40	98	81	88
Switzerland	8	16	53	52	91	68	100
Belgium	9	16	61	15	94	92	89
Canada	10	17	54	42	87	84	88
Finland	11	16	59	23	100	66	90
Ireland	12	15	60	51	93	59	86
Hong Kong	13	13	56	48	96	77	84
Sweden	14	16	50	28	96	78	96
Korea, Rep.	15	19	50	49	86	71	79
Denmark	16	14	54	26	95	73	91
Spain	17	15	55	31	91	80	77
Norway	18	14	53	28	94	56	97
Austria	19	16	51	19	95	62	94
Italy	20	18	52	23	88	61	77
Poland	21	18	55	11	90	49	76
Czech Republic	22	17	52	10	91	49	85
Portugal	23	10	67	11	94	62	77
Australia	24	16	52	32	86	35	91
Estonia	25	15	51	9	96	48	86
India	26	22	64	19	79	36	57
Slovenia	27	15	56	11	93	48	76
Israel	28	17	54	23	84	43	78
Malaysia	29	13	65	8	89	56	69
Slovakia	30	16	52	9	91	36	78
Lithuania	31	16	50	9	91	47	73
Latvia	32	15	50	8	91	44	75
Chile	33	13	54	15	88	47	76
Hungary	34	15	49	8	92	40	67
Panama	35	12	54	9	81	77	58
Croatia	36	15	54	8	91	43	46

	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>Mexico</i>	37	14	57	14	79	57	51
<i>Indonesia</i>	38	18	68	8	78	9	54
<i>Greece</i>	39	13	52	10	88	47	50
<i>Cyprus</i>	40	14	51	10	86	31	65
<i>Algeria</i>	41	12	100	5	66	18	39
<i>Turkey</i>	42	14	65	10	74	48	44
<i>Romania</i>	43	15	50	8	88	29	59
<i>Russia</i>	44	21	52	25	67	30	39
<i>Bulgaria</i>	45	15	51	6	86	23	58
<i>Saudi Arabia</i>	46	12	61	14	70	44	60
<i>Qatar</i>	47	9	60	29	70	42	67
<i>Peru</i>	48	11	63	7	77	37	57
<i>Bahrain</i>	49	10	56	12	85	42	48
<i>Honduras</i>	50	11	72	2	77	38	35
<i>Uruguay</i>	51	10	57	9	78	40	59
<i>New Zealand</i>	52	14	8	18	93	34	93
<i>Brazil</i>	53	15	56	29	66	30	39
<i>Dominican Rep.</i>	54	10	58	5	81	45	42
<i>Jordan</i>	55	10	57	4	88	29	39
<i>El Salvador</i>	56	11	55	4	81	36	43
<i>Costa Rica</i>	57	8	56	9	79	28	59
<i>Kuwait</i>	58	10	59	14	67	24	61
<i>Morocco</i>	59	6	54	5	83	49	57
<i>Thailand</i>	60	9	52	7	82	30	54
<i>South Africa</i>	61	11	54	6	73	43	49
<i>Kazakhstan</i>	62	13	55	7	89	12	31
<i>Cote d'Ivoire</i>	63	11	65	1	75	35	28
<i>Vietnam</i>	64	5	72	6	75	28	43
<i>Azerbaijan</i>	65	15	55	5	72	21	30
<i>Paraguay</i>	66	11	66	3	76	18	32
<i>Ecuador</i>	67	9	54	6	82	47	27
<i>Serbia</i>	68	11	54	4	83	17	38
<i>Colombia</i>	69	11	41	9	76	41	51
<i>Bolivia</i>	70	12	58	2	79	4	34
<i>Ukraine</i>	71	16	47	5	76	24	12
<i>Philippines</i>	72	6	60	6	76	6	58
<i>Sri Lanka</i>	73	8	56	4	78	24	38
<i>Belarus</i>	74	11	48	6	94	22	7

	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>Uzbekistan</i>	75	14	55	4	76	6	16
<i>Egypt, Arab Rep.</i>	76	13	55	6	53	45	25
<i>Argentina</i>	77	12	52	10	57	32	32
<i>Lebanon</i>	78	11	57	7	69	26	20
<i>Cuba</i>	79	12	53	6		34	1
<i>Guatemala</i>	80	6	42	4	76	35	41
<i>Tunisia</i>	81	11	39	5	71	17	40
<i>Ghana</i>	82	10	45	2	65	20	36
<i>Bangladesh</i>	83	8	70	4	56	7	28
<i>Oman</i>	84	10	1	9	85	40	55
<i>Uganda</i>	85	4	63	1	74	7	28
<i>Pakistan</i>	86	12	53	3	51	26	21
<i>Cameroon</i>	87	12	64	1	43	6	27
<i>Tanzania</i>	88	4	63	2	55	12	30
<i>Ethiopia</i>	89	6	64	2	54	1	20
<i>Venezuela</i>	90	11	51	5	45	18	1
<i>Cambodia</i>	91	1		2	76	4	29
<i>Congo, Dem. R.</i>	92	13	66	1	1	4	9
<i>United Arab E.</i>				19	84	72	69
<i>Angola</i>				6	50	4	16
<i>Nigeria</i>				5	51	15	15
<i>Kenya</i>				4	72	26	38
<i>Nicaragua</i>				2	70	23	24

* **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

Advanced manufacturing is considered a sub-sector for almost all industries, so it is assumed that it is also an industry with the widest scope of all of the MPis. Resulting from this, the market size dimension is measured by the value of all manufacturing, rather than the manufacturing value of specific products. The values recorded are supported by the indicators measuring the education and skill of the labor force; which is comprised of people who are most likely to be employed in advanced manufacturing jobs.

Two indicators representing education within the market size dimension have slightly changed terminology from 2016 to 2017, with "secondary and tertiary education" as of 2016 changing to "intermediate and advanced education" with this year's report. Also, "students at secondary level technical colleges" is now referred to as "students in vocational secondary education". The subsequent market growth rate dimension reflects the updated terminology, and has been measured by calculating the Compound Annual Growth Rate (CAGR) of each market size indicator for the last 5 years.

The indicator "number of nanotechnology patent grants" is used along with other more generic market capacity indicators, assuming the level of nanotechnology advancement is a good indicator of advanced manufacturing in a country. Since there is not a focus on a specific product group, no trade indicators have been used to measure the market openness dimension.

Finally, the last indicator that has changed within the past year is the "cost to import" indicator within the market openness dimension. For 2017, this indicator has been divided into two separate indicators, with the cost to import being measured through border and documentary compliance.

Indicators & Resources

<i>Dimension</i>	<i>Weight</i>	<i>Measures Used</i>
<i>Market Size</i>	30	<ul style="list-style-type: none"> Labor Force with Intermediate & Advanced Education (2016)² Manufacturing, Value Added (2015)¹ Students in Vocational Secondary Education (2015)¹
<i>Market Growth Rate</i>	15	<ul style="list-style-type: none"> CAGR of Labor Force with Intermediate & Advanced Education (2011-2016)² CAGR of Manufacturing, Value Added (2010-2015)¹ CAGR of Students in Vocational Secondary Education (2010-2015)¹
<i>Market Capacity</i>	10	<ul style="list-style-type: none"> Foreign Direct Investment, Net Inflows (2015)¹ GNI Per Capita (2016)³ R&D Expenditure (2016)³ Nanotechnology Patent Grants (2014)⁴

<i>Dimension</i>	<i>Weight</i>	<i>Measures Used</i>
<i>Market Openness</i>	15	<ul style="list-style-type: none"> • Burden of Customs Procedure (2016)¹ • Cost to Import, Border Compliance (2016)¹ • Cost to Import, Documentary Compliance (2016)¹
<i>Logistics Infrastructure</i>	15	<ul style="list-style-type: none"> • Distance of Country from US (2016)⁵ • Liner Shipping Connectivity Index (2016)¹ • Logistics Performance Index (2016)¹ • Quality of Port Infrastructure Index (2016)¹
<i>Country Risk</i>	15	<ul style="list-style-type: none"> • Political Risk Rating (2016)⁶ • Economic Risk Rating (2016)⁷ • Business Risk Rating (2016)⁸ • Intellectual Property Rights Protection (2016)⁹

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

¹ World Bank, [World Development Indicators](#)

² International Labor Organization, [ILOSTAT](#)

³ Passport GMID, [Global Market Information Database](#)

⁴ Organisation for Economic Co-Operation and Development, [OECD.Stat](#)

⁵ Happyzebra, [Distances](#)

⁶ Credendo, [Country Risk and Insights](#)

⁷ Coface, [Economic Studies](#)

⁸ Swiss Export Risk Insurance, [Cover Practice for Countries and Banks](#)

⁹ International Property Rights Index, [2016 IPRI Report](#)

Year To Year Comparison

Country	RANK		
	2017	2016	2014
China	1	1	1
Japan	2	2	3
Germany	3	4	2
United Kingdom	4	5	16
France	5	9	13
Netherlands	6	8	19
Singapore	7	3	5
Switzerland	8	14	4
Belgium	9	10	15
Canada	10	6	8
Finland	11	15	7
Ireland	12	27	25
Hong Kong	13	12	6
Sweden	14	11	9
Korea, Rep.	15	7	10
Denmark	16	20	17
Spain	17	21	28
Norway	18	18	26
Austria	19	19	18
Italy	20	33	27
Poland	21	26	32
Czech Republic	22	35	30
Portugal	23	32	37
Australia	24	25	23
Estonia	25	23	31
India	26	17	39
Slovenia	27	34	29
Israel	28	42	21
Malaysia	29	24	24
Slovakia	30	45	35
Lithuania	31	31	38
Latvia	32	44	44
Chile	33	38	33
Hungary	34	46	36
Panama	35		
Croatia	36	56	50
Mexico	37	28	45
Indonesia	38	37	46
Greece	39	61	47
Cyprus	40	49	42
Algeria	41	71	83
Turkey	42	39	49
Romania	43	58	66
Russia	44	36	48
Bulgaria	45	55	52
Saudi Arabia	46	29	43
Qatar	47	22	22
Peru	48	41	60
Bahrain	49	59	34

Country	RANK		
	2017	2016	2014
Honduras	50	63	56
Uruguay	51	57	53
New Zealand	52	30	12
Brazil	53	72	51
Dominican Rep.	54	48	58
Jordan	55		
El Salvador	56	85	67
Costa Rica	57	51	54
Kuwait	58	52	40
Morocco	59	54	55
Thailand	60	62	59
South Africa	61	60	62
Kazakhstan	62	79	82
Cote d'Ivoire	63		
Vietnam	64	40	65
Azerbaijan	65	77	78
Paraguay	66	65	72
Ecuador	67	69	77
Serbia	68	74	70
Colombia	69	66	64
Bolivia	70		
Ukraine	71	82	80
Philippines	72	53	63
Sri Lanka	73	50	73
Belarus	74	86	81
Uzbekistan	75	89	86
Egypt, Arab Rep.	76	64	57
Argentina	77	80	69
Lebanon	78		
Cuba	79	83	79
Guatemala	80	70	68
Tunisia	81	68	61
Ghana	82		
Bangladesh	83	67	75
Oman	84	81	20
Uganda	85		
Pakistan	86	73	71
Cameroon	87		
Tanzania	88		
Ethiopia	89		
Venezuela	90	84	87
Cambodia	91	78	85
Congo, Dem. Rep.	92		
United Arab E.		16	11
Angola			
Nigeria		47	74
Kenya			
Nicaragua		75	84

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 Yenyurt,
[Industrial Marketing Management, October 2004, Volume 33, Issue 7, 607-617](#)