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

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Market Overview

Middle East

The Middle East is set to be the fastest growing region in the world in the airline industry. ¹The United Arab Emirates and Saudi Arabia both have strong aerospace market potential. These Middle Eastern countries are placing more emphasis on the aerospace industry and have low operating costs and taxes as well as good infrastructure and education. One pitfall of the region is its dependency on oil to drive the economy. The UAE has a more diverse economy compared to Saudi Arabia, making it less dependent on oil as an economic driver. Aside from oil prices, fears over terrorism have also contributed to a slowdown in connecting traffic between Asia and Europe through the Gulf hubs. These factors contributed to Saudi Arabia falling ten places in the rankings and UAE falling five.

In commercial aerospace, the Middle East remains an important market due to its strategic location as a hub, linking the major global airline networks. Also, increased wealth creation in the region, including a large growth in the middle class, has increased passenger air traffic.² The Dubai International Airport is the world's largest for international passenger traffic, contributing 30% to Dubai's GDP.³

Additionally, as global tensions rise, defense spending has increased in the Middle East. This includes increased purchases of military aircraft. Saudi Arabia imports a good amount of military aircraft from the US, and due to this, the country also requires a regular supply of parts and related equipment to support frequent maintenance, repair, and overhaul (MRO).⁴

Asia

Like the Middle East, Asia has a fast-growing aerospace industry. Asia continues to demonstrate vigorous economic growth. Driven by China and India, the region's share of world GDP is projected to rise from 31 percent today to 39 percent by 2035. As a result, airlines, airport capacity, and passenger traffic are all expected to experience a high growth rate in the next 20 years.⁵

China: China has been forecasted to become the largest single aerospace market in the world in the next 20 years. Boeing estimates China will require 6,180 jets worth \$1 trillion during

¹ Moody's: https://www.moodys.com/research/Moodys-Global-airline-industry-outlook-remains-stable-fuel-costs-and--PR 360734

² Boeing: http://www.boeing.com/commercial/market/long-term-market/world-regions/

³ PwC: https://www.pwc.com/m1/en/publications/megatrends/pdf/megatrends-in-me-shift-in-economic-power.pdf

⁴ ITA 2016 Top Markets Report: http://www.trade.gov/topmarkets/pdf/Defense Middle East.pdf

⁵ Boeing: http://www.boeing.com/commercial/market/long-term-market/world-regions/

this time period. This growth is fueled by demand for air travel from a fast-growing middle class. ⁶ Therefore, China has been ranked #1 in both 2016 and 2017.

China currently imports most of their aircraft.⁷ To date, China's experience is largely limited to warplane engines, mostly in cooperation with or on license from Russia.⁸ However, China has placed its aerospace industry as a top national priority. They are investing a significant amount of money and resources, including the establishment the Aero Engine Corp of China, which is set to research, develop, and manufacture aircraft engines for the Chinese aviation industry. Their aspirations in aircraft manufacturing may lead to a rise in competition between domestic and foreign firms as well as nationalistic policies.⁹ China has just manufactured and tested its first commercial airplane, the C919. However, the plane is over 10 years behind planes produced by Airbus and Boeing.¹⁰ It is still a matter of time until they are able to produce their own engines that compete with leading technology.

India: India also has a growing aerospace sector and has expanded through partnerships, new factories, and research facilities, contributing to India's rise six places to #16 in the rankings from 2016 to 2017. Economic liberalization measures, including industrial deregulation, privatization of state-owned enterprises, and reduced controls on foreign trade and investment that began in the 1990s are contributing to economic growth. The deregulation extends to the airline market as well. For example, the relaxing of the "5/20 rule" for airlines to operate internationally makes it easier for smaller and newer Indian Airlines to expand.¹¹

India's GDP is forecast to grow at 6.6 percent per year over the next 20 years. India's domestic traffic has enjoyed strong growth, partially due to the growing middle class.

International traffic is also up to a smaller degree, but growth is slowed by lingering protectionist policies. 12

Japan: At #5 in the rankings in 2016 and 2017, Japan continues to offer a lucrative market for imported aircraft, aircraft parts, and engines. U.S. firms have an overwhelming presence in the market due to long-standing relationships in Japan. There are opportunities in the market as the Japanese industry undertakes international projects, develops transport and patrol aircraft for defense, and develops small jets and small jet engines for civil aviation.¹³

⁶ Ibid

⁷ ITA 2016 Top Markets Report: http://trade.gov/topmarkets/pdf/Aircraft Parts China.pdf

⁸ Reuters: http://www.reuters.com/article/us-airshow-china-engines-idUSKBN12Z11U

⁹ Export.gov: https://www.export.gov/article?id=Overview-of-Aircraft-Parts-in-China

¹⁰ NY Times: https://www.nytimes.com/2017/05/05/business/china-airplane-boeing-airbus.html

¹¹ Ibid

¹² Boeing: http://www.boeing.com/commercial/market/long-term-market/world-regions/

¹³ Export.gov: https://www.export.gov/apex/article2?id=Japan-Aircraft-and-related-parts-equipment-and-services

Japan's tensions with nearby North Korea and China have focused national attention on the development of new domestic military aerospace capabilities that will lead to additional investment in that sector.

In the commercial sector, Japan has been working on developing its own commercial jetliner. Although the Mitsubishi Regional Jet (MRJ) has been delayed 5 times, the plane, once delivered, has the goal of cementing an industry revival. The MRJ is the first step in a long process of the reestablishment of a domestic airline industry.

Singapore: Unlike other top markets listed above, Singapore's market is centered on the maintenance industry. Much of the maintenance work done in Singapore is performed on aircraft registered outside of Singapore. Singapore is known for their infrastructure, stability, and workforce. Singapore's favorable customs regime and its location in a rapidly growing regional aviation market have attracted many firms from the United States and Europe to set up subsidiaries in Singapore.14 Though MRO is the main focus, there is a limited amount of manufacturing in Singapore. Notably, the three major commercial engine manufacturers (GE, Pratt & Whitney and Rolls-Royce) all have facilities in Singapore. Singapore is ranked #7 in the 2017 index.

Europe

Although aviation growth in Europe is slower than in the emerging economies of Asia and the Middle East, the region's large base of over 4,600 airplanes supports substantial demand for replacement airplanes. Replacement demand will account for 56 percent of Europe's total new airplane market. The European aviation market is expected to grow during the next 20 years, with airlines forecast to acquire more than 7,500 new airplanes valued at over \$1.1 trillion.

France has the largest aerospace market in Europe with 2015 revenues of USD 65.7 billion, the UK next with USD 48.1 billion, and Germany third with USD 38.5 billion. They were ranked second, third, and fourth respectively for market potential in both 2016 and 2017. Spain and Ireland also have sizeable markets worth pursuing, rising in the rankings from 2016-2017. They are ranked tenth and eleventh respectively on market potential.

Important regulatory hurdles facing U.S. aircraft exporters concern the European Aviation Safety Agency (EASA), the European counterpart to the U.S. Federal Aviation Administration (FAA). The level of fees charged by EASA to validate the FAA's original airworthiness certification discourages small and medium-sized U.S. manufacturers from pursuing entry into the European market.¹⁷

¹⁴ ITA Top Markets Report: http://trade.gov/topmarkets/pdf/Aircraft Parts Singapore.pdf

¹⁵ Boeing: http://www.boeing.com/commercial/market/long-term-market/world-regions/

¹⁶ Ibid

¹⁷ European Aviation Safety Agency: https://www.easa.europa.eu/regulation-groups/fees-and-charges

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.

Canada: Despite the recent downturn, Canada's aerospace and defense (A&D) industry has tripled in terms of global market share in the last 20 years, making Canada the fifth largest aerospace producer in the world. Canada is also the world's third largest civil aircraft manufacturer. ¹⁸ The aerospace industry in Canada is R&D intensive, with capital investments upwards of \$1.9 billion making it a leader in aircraft technology development and application. ¹⁹ New entrants from the U.S. most likely would face competition from current U.S. exporters to Canada, as well as from European and local Canadian companies. ²⁰ Canada is #6 in the rankings in both 2016 and 2017.

Mexico: With the help of many free trade agreements and its geographic location, Mexico is home to most of the global main players in the aerospace industry. ²¹ Low manufacturing costs and proximity to the US market are the main reasons investors have flocked to Mexico. Another advantage is that Mexico has a skilled workforce due to specialized training centers like Queretaro's aerospace university. Many Mexicans have access to university education where they can take courses in manufacturing and engineering for little to no cost. Mexico has placed Aerospace as a national priority. ProAéreo 2012 – 2020, also known as the national strategic program, is a program to place Mexico among the top 10 countries in the world in the aerospace production. Mexico is #23 in the rankings, rising 3 places from 2016.

However, there are still some challenges of conducting business in Mexico. Challenges include lengthy border crossing times and criminal activity which can add unanticipated costs. ²²

The uncertainty of the future of NAFTA also is a threat to the aerospace industry in Mexico.

¹⁸ Boeing: http://www.boeing.com/commercial/market/long-term-market/world-regions/

¹⁹ Aerospace Industries Association of Canada: http://aiac.ca/industry-statistics/

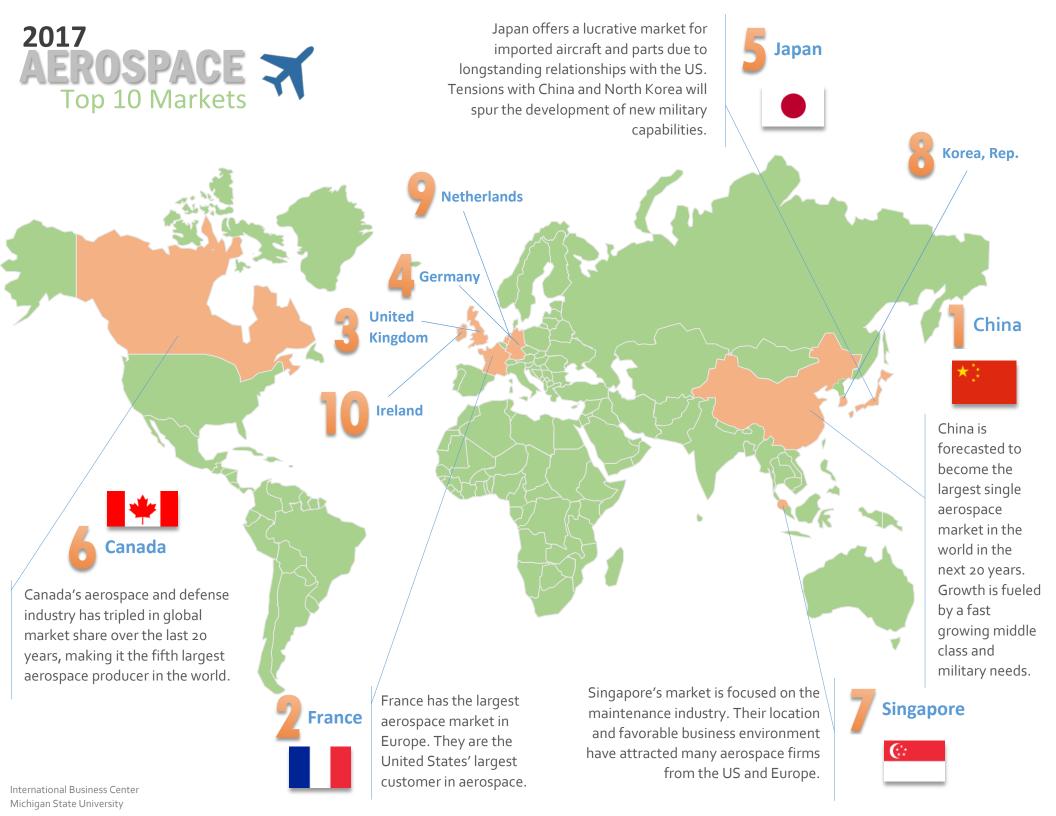
²⁰ ITA Top Markets Report: http://trade.gov/topmarkets/pdf/Aircraft Parts Canada.pdf

²¹ PWC Aerospace Industry in Mexico: https://www.pwc.com/mx/es/knowledge-center/archivo/20150604-gx-publication-aerospace-industry.pdf

²² EY Megatrends shaping the Mexican Aerospace and Defense sector:

http://www.ey.com/Publication/vwLUAssets/Megatrends shaping the Mexican aerospace and defense sector

/\$FILE/EY-megatrends-shaping-the-mexican-aerospace-and-defense-sector.pdf



Results of the 2017 Aerospace 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	54	100	75	78	60
France	2	72	36	40	82	79	88
United Kingdom	3	53	40	48	90	89	87
Germany	4	53	33	35	80	89	94
Japan	5	42	43	42	93	67	92
Canada	6	35	37	27	89	84	88
Singapore	7	16	41	4	100	81	88
Korea, Rep.	8	19	55	17	86	71	79
Netherlands	9	9	41	10	92	100	92
Ireland	10	17	73	3	82	59	86
Spain	11	18	41	14	83	80	77
Switzerland	12	11	41	7	92	68	100
United Arab E.	13	20	64	3	78	72	69
Australia	14	20	37	22	87	35	91
Hong Kong	15	11	48	4	93	77	84
India	16	23	67	32	69	36	57
Belgium	17	7	41	7	84	92	89
Norway	18	7	36	7	96	56	97
Denmark	19	4	47	6	88	73	91
Sweden	20	5	33	9	82	78	96
Brazil	21	20	38	58	73	30	39
Italy	22	13	22	25	78	61	77
Mexico	23	11	53	30	82	57	51
Saudi Arabia	24	14	49	29	73	44	60
Finland	25	4	39	5	86	66	90
New Zealand	26	7	38	4	94	34	93
Austria	27	5	32	6	83	62	94
Malaysia	28	11	41	5	86	56	69
Portugal	29	5	43	4	82	62	77
Russia	30	21	52	35	61	30	39
Poland	31	5	53	8	76	49	76
Czech Republic	32	3	38	4	87	49	85
Lithuania	33	2	62	2	88	47	73
Turkey	34	16	44	16	72	48	44

	OVERALL RANK	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)
1	35	5	37	7	87	43	78
Israel	36	7	57	13	82	41	51
Colombia	37	7	98	5	76	28	43
Vietnam Estonia	38	1	37	1	83	48	86
Thailand	39	12	44	6	84	30	54
Bahrain	40	3	82	2	81	42	48
Chile	41	5	38	8	74	47	76
Panama	42	4	57	3	61	77	58
Oman	43	3	59	8	80	40	55
Slovenia	44	2	34	1	78	48	76
Hungary	45	4	39	3	80	40	67
Morocco	46	3	39	3	81	49	57
Philippines	47	12	62	6	68	6	58
Peru	48	4	50	5	76	37	57
Qatar	49	6	28	2	69	42	67
Greece	50	4	30	5	81	47	50
South Africa	51	6	32	11	73	43	49
Serbia	52	1	84	2	84	17	38
Croatia	53	2	53	2	79	43	46
Latvia	54	2	12	2	81	44	75
Romania	55	3	49	3	72	29	59
Indonesia	56	11	32	14	70	9	54
Uruguay	57	1	21	2	85	40	59
Costa Rica	58	1	37	3	79	28	59
Honduras	59	2	69	2	66	38	35
El Salvador	60	2	38	2	81	36	43
Slovakia	61	1	2	2	75	36	78
Argentina	62	6	40	19	64	32	32
Bulgaria	63	2	42	3	71	23	58
Jordan	64	2	37	2	86	29	39
Cyprus	65	2	8	1	81	31	65
Ecuador	66	2	24	8	86	47	27
Cote d'Ivoire	67	1	50	1	61	35	28
Dominican Rep.	68	1	25	2	80	45	42
Sri Lanka	69	2	51	2	71	24	38
Ethiopia	70	4	100	2	56	1	20

	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
Kuwait	71	3	14	3	67	24	61
Guatemala	72	1	24	5	74	35	41
Algeria	73	3	41	7	65	18	39
Kenya	74	3	26	4	72	26	38
Paraguay	75	1	20	11	86	18	32
Azerbaijan	76	2	39	2	75	21	30
Tunisia	77	2	39	2	64	17	40
Kazakhstan	78	3	45	3	67	12	31
Egypt, Arab Rep.	79	3	40	4	48	45	25
Bolivia	80	1	20	12	77	4	34
Cambodia	81	1	74	1	45	4	29
Bangladesh	82	3	47	2	57	7	28
Nicaragua	83			2	71	23	24
Lebanon	84	2	45	1	53	26	20
Pakistan	85	2	30	6	47	26	21
Uzbekistan	86	2	26	2	71	6	16
Tanzania	87	2	29	1	53	12	30
Uganda	88	1	7	1	71	7	28
Cameroon	89	1	54	2	39	6	27
Venezuela	90	3	52	4	45	18	1
Ukraine	91	2	1	3	68	24	12
Belarus	92	2	37	2	50	22	7
Ghana	93		10	2	55	20	36
Nigeria	94	3	26	5	39	15	15
Angola	95	2	16	4	52	4	16
Cuba	96	3	31		37	34	1
Congo, Dem. Rep.	97		32	5	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

Market size of Aerospace industry is measured using indicators that show the size of air transport and airline markets as well as the production of aerospace equipment. The value of aerospace equipment imports is also used as another market size variable, assuming that it's a good indicator of the country's aerospace market size. Market growth rate is measured by calculating the Compounded Annual Growth Rate (CAGR) of each market size indicator for the last five years.

For the market capacity, consumer expenditure on air travel is used, assuming that it's a good indicator of the capacity of the aerospace industry of a country. On the other hand, tax revenue of countries is considered as a good indicator of their likelihood of investing in government owned aerospace industries as well investing in military aircraft equipment. Also, total military expenditure is used as another indicator for market capacity to be able to cover the spending on military aircraft. Along with the other generic export related indicators, tariff and imports data for the following Harmonized System (HS) codes are used for the measurement of the market openness dimension.

HS7 Code	DEFINITION
8802	Other aircraft (for example, helicopters, airplanes); spacecraft (including satellites) and suborbital and spacecraft launch vehicles
8803	Parts of goods for HS7 code 8802
8805	Aircraft launching gear; deck-arrestor or similar gear; ground flying trainers; parts of the foregoing articles
8411	Turbo-jets, turbo-propellers and other gas turbines

Indicators and Resources

Dimension	Weight	Measures Used
Market Size	30	 Air Transport, Registered Carrier Departures Worldwide (2015)³ Airline Market Size (2016)¹ Imports of Aerospace Equipment (2016)² Production of Aircraft and Spacecraft (2016)¹

Dimension	Weight	Measures Used
Market Growth Rate	15	 CAGR of Air Transport, Registered Carrier Departures Worldwide (2010-2015)³ CAGR of Airline Market Size (2011-2016)¹ CAGR of Imports of Aerospace Equipment (2011-2016)² CAGR of Production of Aircraft and Spacecraft (2011-2016)¹
Market Capacity	10	 Consumer Expenditure on Air Travel (2016)¹ Tax Revenues (2014/15)³ Total Military Expenditure (2015)³
Market Openness	15	 Applied Tariff Rate on Aerospace Equipment (2016) ⁴ Burden of Customs Procedure (2016) ³ Cost to Import, Border Compliance (2016) ³ Cost to Import, Documentary Compliance (2016) ³ Imports of Aerospace Equipment from US as a Share of Global Imports (2015/16) ²
Logistics Infrastructure	15	 Distance of Country from US (2016)⁵ Liner Shipping Connectivity Index (2016)³ Logistics Performance Index (2016)³ Quality of Port Infrastructure Index (2016)³
Country Risk	15	 Business Risk Rating (2016) ⁸ Economic Risk Rating (2016) ⁷ Intellectual Property Rights Protection (2016) ⁹ Political Risk Rating (2016) ⁶

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

¹ Passport GMID, Global Market Information Database

² UN Comtrade, <u>Commodity Trade Statistics Database</u>

³ World Bank, World Development Indicators

⁴ World Trade Organization (WTO), <u>Tariff Database</u>

⁵ Happyzebra, <u>Distances</u>

⁶ Credimundi, Country Risks

⁷ Coface, <u>Economic Studies</u>

⁸ Swiss Export Risk Insurance, <u>Cover Practice for Countries and Banks</u>

⁹ International Property Rights Index, <u>2016 IPRI Report</u>

Year To Year Comparison

	RANK			
Country	2017	2016		
China	1	1		
France	2	2		
United Kingdom	3	3		
Germany	4	4		
Japan	5	5		
Canada	6	6		
Singapore	7	7		
Korea, Rep.	8	10		
Netherlands	9	11		
Ireland	10	15		
Spain	11	22		
Switzerland	12	17		
United Arab Emirates	13	8		
Australia	14	12		
Hong Kong SAR, China	15	9		
India	16	23		
Belgium	17	18		
Norway	18	19		
Denmark	19	28		
Sweden	20	16		
Brazil	21	32		
Italy	22	24		
Mexico	23	26		
Saudi Arabia	24	14		
Finland	25	25		
New Zealand	26	20		
Austria	27	29		
Malaysia	28	21		
Portugal	29	35		
Russian Federation	30	33		
Poland	31	37		
Czech Republic	32	47		
Lithuania	33	39		
Turkey	34	27		
Israel	35	38		
Colombia	36	45		
Vietnam	37	53		
Estonia	38	34		
Thailand	39	31		
Bahrain	40	49		
Chile	41	40		
Panama	42			
Oman	43	41		
Slovenia	44	55		
Hungary	45	44		
Morocco	46	42		
Philippines	47	48		
Peru	48	30		
Qatar	49	36		

	RA	NK
Country	2017	2016
Greece	50	65
South Africa	51	50
Serbia	52	62
Croatia	53	64
Latvia	54	52
Romania	55	60
Indonesia	56	54
Uruguay	57	73
Costa Rica	58	46
Honduras	59	56
El Salvador	60	51
Slovakia	61	74
Argentina	62	58
Bulgaria	63	72
Jordan	64	
Cyprus	65	84
Ecuador	66	69
Cote d'Ivoire	67	
Dominican Republic	68	61
Sri Lanka	69	59
Ethiopia	70	
Kuwait	71	63
Guatemala	72	66
Algeria	73	67
Кепуа	74	
Paraguay	75	76
Azerbaijan	76	75
Tunisia	77	71
Kazakhstan	78	81
Egypt, Arab Rep.	79	70
Bolivia	80	
Cambodia	81	80
Bangladesh	82	68
Nicaragua	83	79
Lebanon	84	
Pakistan	85	77
Uzbekistan	86	85
Tanzania	87	
Uganda	88	
Cameroon	89	
Venezuela	90	57
Ukraine	91	82
Belarus	92	87
Ghana	93	
Nigeria	94	83
Angola	95	
Cuba	96	86
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,

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