

Appendix table 6-26

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Leading indicators of technological competitiveness for developing countries/economies: Selected years, 1993–2007

(U.S. = 100)

Country/economy	National orientation	Socioeconomic infrastructure	Technological infrastructure	Productive capacity	Overall
1993					
Larger economies					
Brazil.....	90.9	65.6	47.5	53.6	62.9
China	89.0	55.2	44.2	36.9	54.5
Hungary	95.4	64.2	47.4	40.9	60.0
India.....	74.9	55.2	37.7	43.0	51.4
Indonesia	89.3	58.9	28.9	27.7	48.9
Mexico	68.4	56.8	28.8	30.2	44.7
Russia.....	46.5	46.9	66.7	35.5	49.0
Smaller economies					
Argentina	64.3	75.2	29.1	35.8	50.1
Malaysia.....	116.0	75.8	39.1	52.9	68.4
Philippines.....	61.7	68.5	28.7	38.8	48.5
South Africa.....	106.3	82.9	26.3	47.9	63.4
Thailand	96.5	60.7	30.6	37.2	53.9
1996					
Larger economies					
Brazil.....	76.8	62.4	39.4	45.0	54.7
China	86.4	52.6	41.4	36.6	52.8
India.....	76.0	54.1	41.5	54.9	55.6
Indonesia	72.6	41.3	18.8	21.9	36.9
Mexico	72.6	53.5	31.9	35.5	47.1
Russia.....	64.7	59.5	58.7	47.6	57.3
Smaller economies					
Argentina	54.9	58.0	28.9	34.6	43.3
Hungary	88.6	56.0	38.4	44.5	55.3
Malaysia.....	107.2	73.6	33.6	48.2	63.4
Philippines.....	99.5	74.5	37.6	51.7	63.9
Poland.....	91.8	63.6	37.0	43.7	57.3
South Africa.....	65.1	60.0	42.5	33.5	49.4
Thailand	84.1	57.3	29.7	37.0	50.3
Venezuela.....	59.6	56.0	29.5	28.0	42.3
1999					
Larger economies					
Brazil.....	78.4	56.4	42.0	44.9	54.5
China	83.5	60.5	48.3	46.5	58.8
India.....	87.4	57.4	50.2	59.4	62.7
Indonesia	70.3	48.5	19.0	26.3	39.7
Mexico	53.3	46.5	22.7	28.1	36.8
Russia.....	62.3	60.2	52.5	40.4	53.6
Smaller economies					
Argentina	52.7	61.2	28.7	35.2	43.8
Hungary	95.0	70.6	45.3	48.9	63.6
Malaysia.....	88.8	66.9	32.3	50.1	58.1
Philippines.....	81.4	63.9	22.8	41.7	50.9
Poland.....	81.5	65.5	41.3	47.6	57.9
South Africa.....	64.0	61.6	42.1	32.5	49.5

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(U.S. = 100)

Country/economy	National orientation	Socioeconomic infrastructure	Technological infrastructure	Productive capacity	Overall
Thailand	64.7	53.4	21.3	34.8	42.4
Venezuela.....	51.3	59.4	19.4	28.4	38.8
2003					
Larger economies					
Brazil.....	65.8	58.4	38.2	43.2	51.0
China	78.9	63.7	59.5	59.9	65.2
India.....	78.3	57.1	39.8	57.8	57.5
Indonesia	56.5	45.3	22.3	33.4	38.8
Mexico	69.1	56.7	30.9	42.8	49.2
Russia.....	60.8	69.9	55.2	56.2	60.4
Smaller economies					
Argentina	56.2	60.6	33.5	39.2	47.0
Hungary	83.5	78.6	43.1	50.9	63.4
Malaysia.....	91.5	75.2	31.1	47.3	60.3
Philippines.....	74.3	63.7	25.8	54.3	53.6
Poland.....	79.8	79.1	39.5	51.4	61.8
South Africa.....	67.3	56.9	38.7	36.8	49.5
Thailand.....	59.8	62.8	25.7	37.4	45.9
Venezuela.....	46.6	53.2	21.0	24.5	36.0
2005					
Larger economies					
Brazil.....	75.2	60.9	40.1	55.5	57.3
China	93.8	71.8	70.4	81.7	79.0
India.....	77.7	62.7	47.0	67.6	63.2
Indonesia	55.8	48.5	26.2	46.4	43.7
Mexico	69.5	57.9	33.1	51.6	52.3
Russia.....	53.0	70.3	47.7	50.8	55.3
Smaller economies					
Argentina	60.1	63.4	32.7	48.0	50.5
Hungary	77.9	78.7	44.0	57.9	63.9
Malaysia.....	95.1	83.7	34.2	58.1	66.5
Philippines.....	67.1	62.8	33.9	58.9	55.1
Poland.....	78.0	77.9	37.1	61.5	62.8
South Africa.....	63.8	62.8	39.7	46.5	52.7
Thailand.....	74.1	63.2	27.2	47.9	52.2
Venezuela.....	46.1	56.8	29.5	43.4	43.6
2007					
Larger economies					
Brazil.....	70.6	57.2	38.3	49.7	53.1
China	80.2	69.7	62.9	91.2	75.8
India.....	82.9	62.7	46.5	67.6	64.1
Indonesia	70.4	55.1	32.2	49.8	50.9
Mexico	75.6	57.7	36.1	57.2	55.7
Russia.....	73.9	74.5	50.1	53.5	62.3
Smaller economies					
Argentina	59.4	69.4	34.8	47.8	52.2
Hungary	73.2	76.2	38.7	56.2	60.2
Malaysia.....	97.4	77.3	33.5	62.4	66.0
Philippines.....	70.1	62.5	26.4	50.4	51.3

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(U.S. = 100)

Country/economy	National orientation	Socioeconomic infrastructure	Technological infrastructure	Productive capacity	Overall
Poland.....	83.4	81.1	37.1	56.0	63.1
South Africa.....	70.8	61.7	39.5	43.2	52.9
Thailand.....	81.6	69.6	27.1	46.5	54.7
Venezuela.....	42.9	46.2	23.5	34.5	36.3

NOTES: Developing countries classified as low or middle income by World Bank. Larger economies have 2004 gross domestic product (GDP) \geq \$750 billion expressed in 1990 purchasing power parities (PPPs). Smaller economies have 2004 GDP \leq \$750 billion expressed in 1990 PPPs. High-technology indicators previously based on most recent full year of statistical data, but now based on year of data generation and year in which panel of experts rated countries. For score and indicator calculations, raw data transformed into scales of 0–100 for each indicator component and then averaged to generate comparable indicators with a 0–100 range. For survey items, 100 represents highest response category for each question; for statistical data, 100 typically represents value attained by country with largest value among 33 countries included in study. In indicator formulations cited below, each term carries equal weight.

National orientation (NO) provides evidence that a nation is taking directed action to achieve technological competitiveness. These actions could take place in business, government, or cultural sector or any combination of the three.

Indicator formulation: $NO = [Q1 + (Q2 + Q3)/2 + Q4 + F1V2002]/4$.

Data used: Published data from PRS Group, Political and Economic Forecast table, Political Risk Letter for 2002 rating each country's investment risk (F1V2002); and survey data assessing each country's national strategy to promote high-technology development (Q1), social influences favoring technological change (Q2 and Q3), and entrepreneurial spirit (Q4).

Socioeconomic infrastructure (SE) assesses social and economic institutions that support and maintain physical, human, organizational, and economic resources essential to functioning of a modern, technology-based industrial nation.

Indicator formulation: $SE = (Q5 + Q10 + HMHS2000)/3$.

Data used: Published data on percentage of students enrolled in secondary (net percentage) and tertiary (gross percentage) education (HMHS2000) from Harbison-Myers Skills Index for 2000, Gross and Net Enrollment Ratio at Secondary Level by Country and by Gender for school years 1998/1999 and 1999/2000, Institute for Statistics, United Nations Educational, Scientific, and Cultural Organization (UNESCO), October 2002 and Gross Enrollment Ratio at Tertiary Level by Country and Gender for academic years 1998/1999 and 1999/2000, Institute for Statistics, UNESCO, October 2002; and survey data assessing each country's efforts to attract foreign investment (Q10) and mobility of capital (Q5).

Technological infrastructure (TI) assesses the institutions and resources that contribute to a nation's capacity to develop, produce, and market new technology.

Indicator formulation: $TI = [(Q7 + Q8)/2 + Q9 + Q11 + EDP2002 + S\&E2000]/5$.

Data used: Published data from Science and Technology, Personnel Engaged in R&D by Category of Personnel (new available data for 1996–2000), Institute for Statistics, UNESCO, November 2002, on number of scientists and engineers involved in research in 2000 (S&E 2000), national purchases of electronic data-processing equipment (EDP2002) from Reed Electronics Research, Yearbook of World Electronics Data 2002/2003, Reed Business Information Ltd. (2002); and survey data assessing linkages of R&D to industry (Q9), output of indigenous academic S&E (Q7 and Q8), and ability to make effective use of technological knowledge (Q11).

Productive capacity (PC) assesses physical and human resources devoted to manufacturing products and efficiency employing those resources.

Indicator formulation: $PC = (Q6 + Q12 + Q13 + A262002)/4$.

Data used: Published data on electronics production (A262002) from Reed Electronics Research, Yearbook of World Electronics Data 2002/2003, Reed Business Information Ltd. (2002); and survey data assessing the supply and quality of skilled labor (Q6), capability of indigenous management (Q13), and existence of indigenous suppliers of components for technology-intensive products (Q12).

Composite indicator is sum of $NO + SE + TI + PC$.

SOURCE: Georgia Institute of Technology, Technology Policy and Assessment Center, High Tech Indicators: Technology-Based Competitiveness of 33 Nations. 2007 Final Report to National Science Foundation, Division of Science Resources Statistics (2007).