CNI

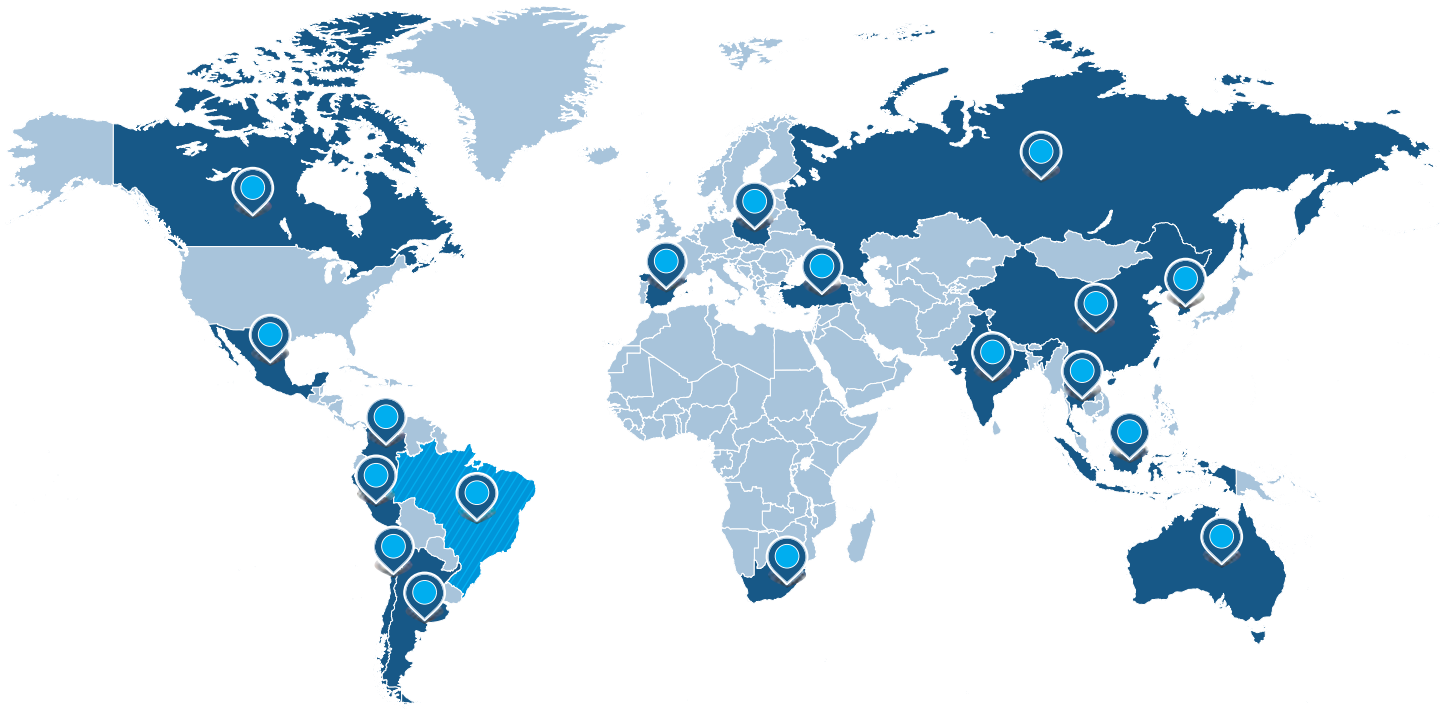# BRAZIL COMPETITIVENESS REPORT
2018-2019

A COMPARISON WITH SELECTED COUNTRIES

BRASÍLIA – 2019

BRAZIL COMPETITIVENESS REPORT
2018-2019

CNI

Brazilian National Confederation of Industry
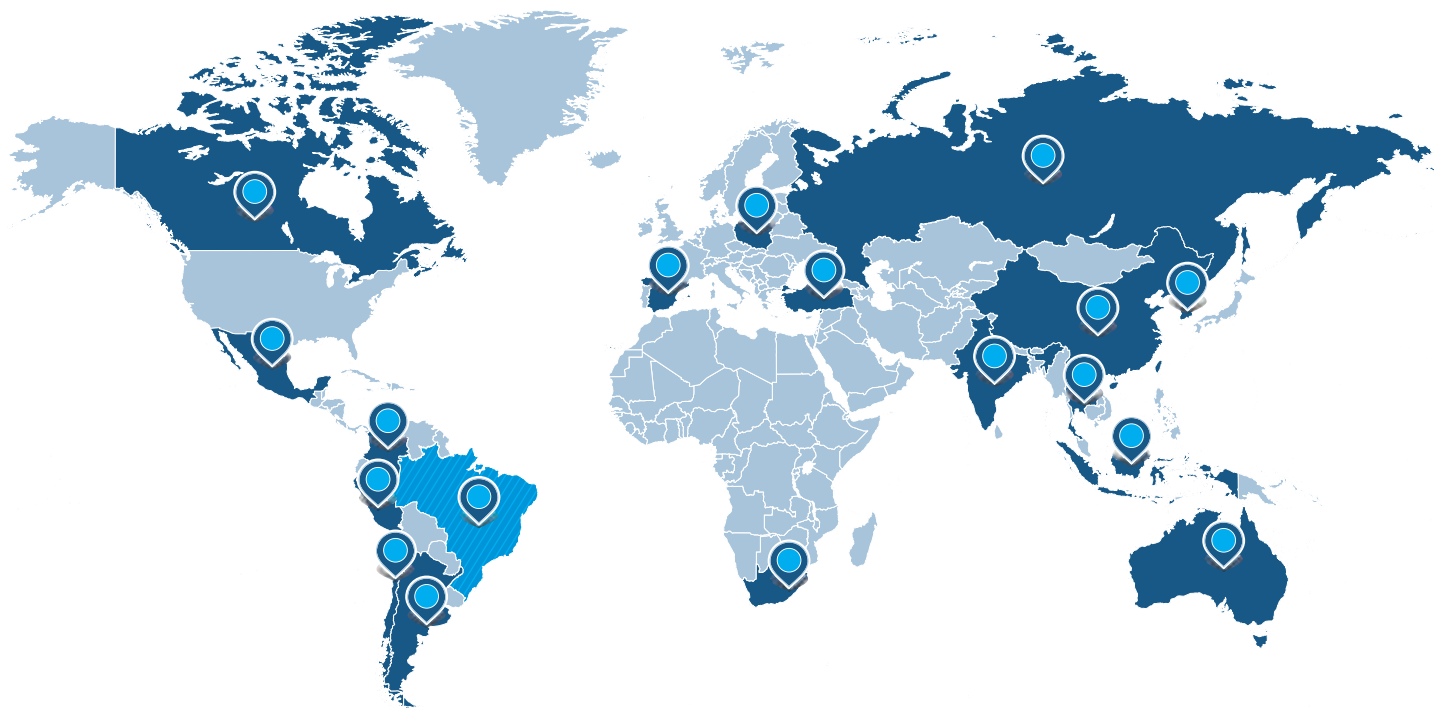
BRAZIL COMPETITIVENESS REPORT
2018-2019

BRASÍLIA

2019

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1. MAIN RESULTS

Brazil makes progress, but not enough to rise in the overall ranking
Brazil recorded improvements in macroeconomic and red tape-related variables, but it remains second to last in the ranking

Brazil was ranked second to last in the general 2018-2019 ranking, behind Peru and ahead of Argentina. In addition to these three countries, India, Colombia and Indonesia are also in the bottom third of the overall ranking. Chile and Mexico, the two other cases of Latin American countries, are in the middle third of the ranking, along with Poland, Turkey, Russia and South Africa. South Korea, Canada, Australia, China, Spain and Thailand were ranked in the top third.

In relation to nine determinants of competitiveness, Brazil was included in the top third of the ranking (first six positions) in only one: Availability and cost of labor. This positive result reflects the country's competitiveness in Availability of labor, particularly in the labor force growth subfactor. In terms of cost of labor, Brazil was placed in the bottom third of the ranking, as this cost is relatively high, mainly due to its low labor productivity, which is only higher than that of India. It should be noted that Brazil is undergoing demographic changes and that its job supply is on a downward trend, enhancing the importance of increased productivity.

The country was placed in the middle third of the ranking for the Productive structure, scale and competition, Education and Technology and innovation factors. In Productive structure, scale and competition, it has a competitive advantage in terms of Scale, with the fourth largest domestic market, making up for its poor performance in Competition. In relation to Education, there is also opposition among subfactors. The second highest public expenditure on education (as a percentage of GDP) was recorded for the country, but it was included in the bottom third of the ranking in the other dimensions evaluated: education attainment and assessment.

In the Technology and innovation factor, Brazil is the fifth largest investor in research and development (R&D) as a percentage of GDP, but the low share of private investment in this area led it to be ranked in an intermediate position in R&D efforts. In relation to the Outcomes of R&D efforts subfactor, its performance in the realm of inventions (as reflected in the number of international patent applications) is weak, but it is offset by the average result achieved by the country in published papers and high-technology exports.

In the other five factors, Brazil is one of the countries in the six lowest positions in the ranking. In terms of Infrastructure and logistics, it was ranked 15th due to the country's low competitiveness in Transport infrastructure, Energy infrastructure and International logistics. In the Energy infrastructure subfactor, it was ranked in the last position, reflecting its high costs with electricity and the low quality of its electricity supply.

FIGURE 1 COMPETITIVE POSITION OF THE 18 SELECTED COUNTRIES

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Overall ranking	KOR	CAN	AUS	CHN	ESP	THA	POL	CHL	TUR	RUS	MEX	ZAF	IDN	COL	IND	PER		ARG
Availability and cost of labor	PER	IDN	CHL	TUR	COL		MEX	THA	CHN	CAN	AUS	RUS	ZAF	KOR	ARG	IND	POL	ESP
Availability and cost of capital	CAN	KOR	AUS	CHN	ESP	ZAF	CHL	THA	IND	POL	MEX	TUR	IDN	COL	PER	RUS	ARG	
Infrastructure and logistics	KOR	ESP	CAN	AUS	POL	CHN	TUR	CHL	RUS	THA	ARG	ZAF	MEX	IDN		COL	IND	PER
Taxation	THA	IDN	CAN	KOR	RUS	PER	MEX	ZAF	AUS	CHN	CHL	TUR	IND	COL		POL	ESP	ARG
Macroeconomic environment	CHN	TUR	COL	IDN	AUS	MEX	KOR	RUS	PER	CAN	CHL	THA	POL	IND	ESP		ZAF	ARG
Productive structure, scale and competition	CHN	KOR	POL	ESP	CAN	MEX	IND	RUS	THA	IDN	TUR		AUS	ZAF	CHL	COL	PER	ARG
Business environment	CAN	AUS	KOR	CHL	ESP	CHN	THA	POL	IND	RUS	IDN	ZAF	MEX	TUR	COL		ARG	PER
Education	CAN	AUS	KOR	POL	RUS	ESP	CHL	ARG	ZAF	TUR			COL	THA	MEX	PER	IDN	
Technology and innovation	KOR	CHN	AUS	CAN	THA	ESP	POL		TUR	ZAF	MEX	RUS	CHL	COL	ARG			

🟩 **The country is in the third of countries in a more favorable position** (position de 1 to 6)		
🟨 **The country is in the middle third** (position de 7-12)		
🟥 **The country is in the bottom thir** (position de 13-18)		

ARG: Argentina
AUS: Australia
CAN: Canada
CHL: Chile
CHN: China
COL: Colombia
ESP: Spain
IDN: Indonesia
IND: India
KOR: South Korea
MEX: Mexico
PER: Peru
POL: Poland
RUS: Russia
THA: Thailand
TUR: Turkey
ZAF: South Africa
⬦ : Brazil

Note: The overall ranking was built based on the simple average between the figures for each country in the nine competitiveness factors. For more details, see the methodological note in the fifth section.

In the Macroeconomic environment factor, the country was ranked as the one with the highest general government net debt interest payments and the second lowest investment rate in the economy - higher only than that of Argentina, as a result of which it was ranked 16th in this factor. Brazil was also ranked 16th in the Business environment factor, reflecting the lack of legal certainty and excessive red tape prevailing in the country. In relation to Red tape, it was ranked last in the two variables that reflect procedures affecting the productive sector.

Brazil was ranked last in Availability and cost of capital, mainly because it has the highest real short-term interest rate and the highest interest-rate spread. This is the factor in connection with which the country's competitive gap is more critical: in addition to very large, the gap in relation to other competitors is widening.

As compared to the revised 2017-2018 ranking[1], Brazil has recovered competitiveness in three of the five factors in which it was positioned in the bottom third of the ranking. In the Macroeconomic environment factor, declining inflation and exchange rate depreciation enabled the country to rise from last to 16th position. In the Taxation factor, its performance was positive as compared to the average for all countries, but it remained in the 15th position. In Business environment, it rose from 17th to 16th place, surpassing Peru, as a result of improvements in variables related to red tape, such as a reduction in the time required to start a business.

The main advancement was the one recorded in Availability and cost of labor, a factor in which the country is more competitive on average than its competitors. The country climbed three positions in Labor availability due to its faster labor force growth rate. As a result, it rose from 10th to 6th position in Availability and cost of labor, climbing from the intermediate third to the top third of the ranking.

Brazil lost one position in the Technology and innovation and Education factors. Domestic spending on research and development (R&D) as a proportion of GDP fell from 1.34% in 2015 to 1.27% in 2016, reducing Brazil's advantage over the average of its competitors. In addition, it was surpassed by Thailand, whose indicators for R&D efforts improved. In Education, the country recorded a reduction in expenditure on education and was surpassed by South Korea.

2. BRAZIL'S COMPETITIVENESS FACTORS

2.1 AVAILABILITY AND COST OF LABOR

AVAILABILITY AND COST OF LABOR
6th

Labor cost
13th

Compensation levels in manufacturing
11th

Labor productivity in industry
17th

Labor availability
5th

Labor force participation rate
8th

Labor force growth
6th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

Brazil is in the third of countries in a more favorable position (positions 1-6)

Brazil is in the middle third (positions 7-12)

Brazil is in the bottom third (positions 13-18)
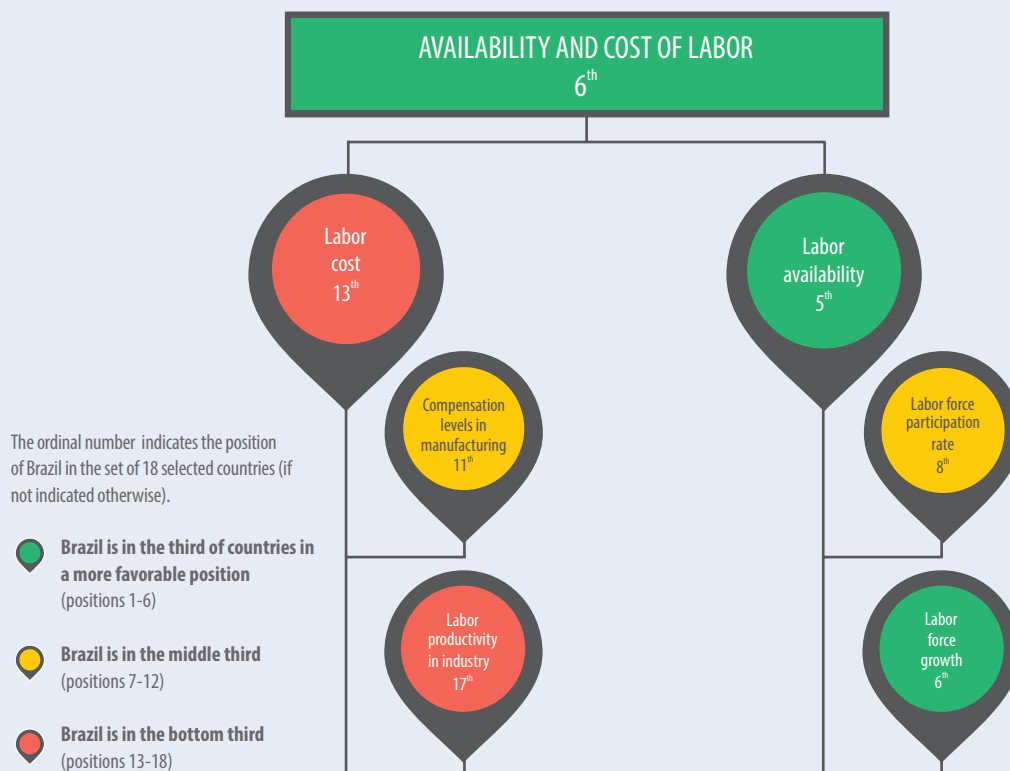
Brazil recorded improvements in labor supply, but its productivity is low

Brazil was ranked 6th in the Availability and cost of labor factor among the 18 selected countries. Of the nine determinants of competitiveness, this is the only factor in which Brazil was positioned in the top third of the ranking (six top positions).

This positive result reflects the country's competitiveness in the Labor availability subfactor, where it was ranked 5th mainly due to its labor force growth. In 2017, Brazil recorded the 6th highest rate, estimated at 1.97%.

This result for labor supply more than makes up for Brazil's poor performance in the Labor cost subfactor. The relatively high cost of this subfactor is mainly due to low labor productivity. Regarding workers' compensation levels, Brazil occupies an intermediate

position (11th), but with respect to labor productivity only India is behind it. As a result, it was ranked 13th in the Labor cost subfactor, in the bottom third of the ranking.

As compared to the revised 2017-2018 ranking[1] , Brazil moved up four positions in the Availability and cost of labor factor, rising from the intermediate third (10th position) to the top third of the ranking.

In the Labor availability subfactor, Brazil rose from 8th to 5th position due to its faster labor force growth rate (from 1.03% in 2016 to 1.97% in 2017).

In relation to the Labor cost subfactor, Brazil remained in the 13th position, despite recording an increase in the level of worker's remuneration, dropping two positions in the ranking for this variable (from 9th to 11th position).

In addition to Brazil, the following countries also stood out for improving their positions in the Availability and cost of labor factor: Australia and Mexico (both moved up 5 positions) and Chile (4 positions). The result achieved by them mainly reflected the faster growth rate of their labor force. In 2017, the highest growth rate, 3.6%, was the one recorded by Turkey.

FIGURE 3 - AVAILABILITY AND COST OF LABOR FACTOR
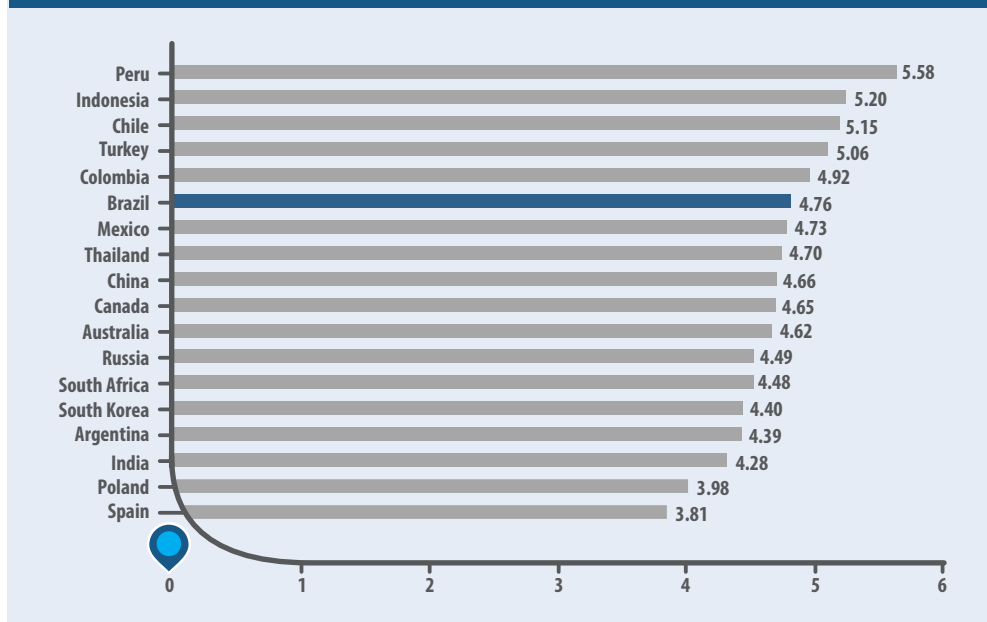
Country	Score
Peru	5.58
Indonesia	5.20
Chile	5.15
Turkey	5.06
Colombia	4.92
Brazil	4.76
Mexico	4.73
Thailand	4.70
China	4.66
Canada	4.65
Australia	4.62
Russia	4.49
South Africa	4.48
South Korea	4.40
Argentina	4.39
India	4.28
Poland	3.98
Spain	3.81

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.2 AVAILABILITY AND COST OF CAPITAL

FIGURE 4 - BRAZIL´s POSITION IN THE AVAILABILITY AND COST OF CAPITAL FACTOR AND ITS ASSOCIATED SUB-FACTORS AND VARIABLES

AVAILABILITY AND COST OF CAPITAL
18th

Capital cost
18th

Interest rate spread
18th

Real short-term interest rate
18th

Capital availability
14th

Domestic credit to private sector
10th

Stock market size
12th

Venture capital availability
17th

Financial system performance
12th among 17

Banking sector assests
6th among 17

Country credit rating
14th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

Brazil is in the third of countries in a more favorable position (positions 1-6)

Brazil is in the middle third (positions 7-12)

Brazil is in the bottom third (positions 13-18)

Brazil records the worst result in Availability and cost of capital

Brazil occupies the last position in the ranking for the Availability and cost of capital factor among the 18 countries evaluated. Brazil is one the countries with the worst performance in all dimensions evaluated - cost, availability and performance of the financial system.

In 2017, Brazil recorded the highest real short-term interest rate (9.6%) and the highest interest rate spread (38.4%), as a result of which it was ranked last in the Capital cost subfactor. It is worth noting that such variables in Brazil are the highest according to data for 60 countries available in the original database. Among the 18 selected countries, Russia recorded the second highest short-term real interest rate (5.2%) and Peru registered the second highest interest rate spread (14.2%), much lower than that observed in Brazil.

In the Capital availability subfactor, the country is in the bottom third of the ranking (14th position) due to its poorer performance in the qualitative variable Venture capital availability, in which it was ranked second to last[2]. In the other variables associated with that subfactor (Stock market size and Domestic credit to private sector, both as measured in relation to GDP), the country occupies an intermediate position.

In relation to the Financial system performance subfactor, Brazil is in the bottom third of the ranking, as it was ranked 12th among 17 countries considered[3]. This result reflects the country's lowest position in the Country credit rating variable (14th position) in 2016. In the variable Banking sector assets, which is also associated with this subfactor, the country was ranked 6th, with such assets accounting for 126.1% of GDP in 2017.

In comparison with the revised 2017-2018 ranking, Brazil remained in last position in the Availability and cost of capital factor. A change in position was recorded only in the variables associated with the Capital availability subfactor, but without reflecting the country's position in this subfactor. In the ranking for Stock market size, it rose one position (from 13th to 12th), mainly due to a loss of positions by Russia (from 10th to 13th), the only country with a lower ranking in the indicator.

With respect to the variable Domestic credit to private sector, the country fell one position (from 9th to 10th), exchanging places with Turkey. Brazil recorded a reduction in funds offered to the private sector by financial institutions in relation to GDP (from 65.7% in 2013-2015 to 65% in 2014-2016), while Turkey registered the fourth highest increase (from 63.8% in 2013-2015 to 66.8% in 2014-2016)

[2] Variable generated based on the perception of how easy it is for companies with innovative but risky projects to raise venture capital.

[3] No information is available for Canada, which was excluded from the ranking.

FIGURE 5 - AVAILABILITY AND COST OF CAPITAL FACTOR

Country	Score
Canada	7.28
South Korea	6.21
Australia	6.20
China	6.02
Spain	5.78
South Africa	5.68
Chile	5.56
Thailand	5.44
India	4.83
Poland	4.82
Mexico	4.81
Turkey	4.58
Indonesia	4.48
Colombia	4.06
Peru	3.96
Russia	3.56
Argentina	2.70
Brazil	1.64
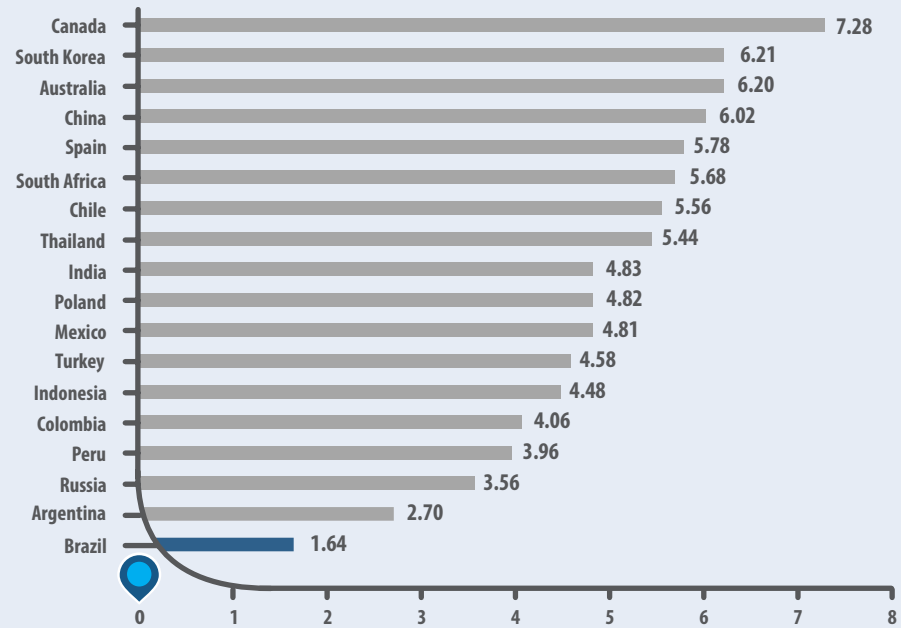
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.3 INFRASTRUCTURE AND LOGISTICS

FIGURE 6 - BRAZIL´s POSITION IN THE INFRASTRUCTURE AND LOGISTICS
FACTOR AND ASSOCIATED SUB-FACTORS AND VARIABLES

INFRASTRUCTURE AND LOGISTICS
15th

Transport infrastructure
17th

Energy infrastructure
18th

Telecommunication infrastructure
9th

International logistics
14th

Quality of roads
18th

Road connectivity index
13th among 17

Electricity costs for industrial clients
13th among 13

ICT Use
7th

Logistic Performance Index (LPI)
14th

Efficiency of train services
17th

Railroad density
14th among 16

Availability of electricity
9th

ICT Access
10th

Time and cost to export and import
13th

Efficiency of seaport services
18th

Liner shipping connectivity
16th

Quality of electricity supply
17th

Efficiency of air transport services
15th

Air transport freight
9th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

● Brazil is in the third of countries in **a more favorable position**
(positions 1-6)

● Brazil is in the **middle third**
(positions 7-12)

● Brazil is in the **bottom third**
(positions 13-18)

22

Inefficient transport infrastructure and high energy costs keep Brazil among the lowest-ranking countries

In Infrastructure and logistics, Brazil was ranked 15th among the 18 countries selected. This result reflects the country's low competitiveness in the Transport infrastructure, Energy infrastructure, and International logistics subfactors. The only subfactor in which the country was not ranked in the bottom third of the ranking (among the six last positions) was that of Telecommunications infrastructure, in which it occupies the 9th position (middle third).

In all transportation modes - highways, railways, seaport and air transportation infrastructures - Brazil was ranked in the lowest positions (bottom third) in the 2018-2019 ranking, as a result of which it occupies the next-to-last position in the Transport infrastructure subfactor. In each mode, Brazil's poor performance was calculated based on business opinion polls and quantitative data. Among all transportation modes, the best position achieved by the country was in the Air transport, freight variable - the only variable in which it was ranked in the middle third, in 9th position[4].

In the Energy infrastructure subfactor, Brazil was ranked last among the 18 countries selected, with the highest electricity cost for industrial customers among the 13 countries considered[5], US$0.17 per Kwh in 2017. In Chile, the country with the second highest rate, this cost is US$0.14.

In addition to energy cost, the energy availability and quality dimensions are evaluated. In the ranking for the variable Availability of electricity, which measures the ratio between electricity and heat production and GDP, the country was ranked in the middle third, occupying the 9th position among the 18 competitors. In Quality of electricity supply, the country occupies the next-to-last position, with transmission and distribution losses of 15.1% of the electricity generated, according to data from 2015.

In International logistics, Brazil was ranked in the bottom third, in 14th position. The following variables are associated with this subfactor: Logistic Performance Index (LPI), a qualitative indicator that reflects perceptions about foreign trade logistics and Time and cost to export and import, which measures the time and cost involved in exporting and importing goods. In the ranking for both, Brazil is among the lowest-ranking countries (14th and 13th position, respectively).

In relation to the revised 2017-2018 ranking, Brazil remained in the 15th position in the Infrastructure and logistics factor. Among the subfactors, the only change recorded was in International logistics, in which the country rose from 16th to 14th place. This advancement reflects a reduction in the cost to export and import according to requirements at the border and a reduction in the time to import, according to the Doing Business 2019 survey conducted by the World Bank.

Brazil lost positions in some of the variables related to the Transport infrastructure subfactor: Quality of roads (3 positions), Efficiency of train services and Liner shipping connectivity (1 position in both). In all cases, even though no deterioration was recorded in the indicators, Brazil was displaced by the improved positions of competitors (Colombia, Argentina and Russia).

[4] The Air transport, freight indicator results from multiplying tons of cargo by kilometers traveled.

[5] The data for Brazil is a CNI estimate based on tariff data made available by ANEEL (the Brazilian electricity regulatory agency) and on the Central Bank's exchange rate. No information is available for South Africa, Australia, China, India, and Thailand, which were excluded from the ranking.

FIGURE 7 - INFRASTRUCTURE AND LOGISTICS FACTOR

Country	Score
South Korea	7.81
Spain	7.28
Canada	7.13
Australia	6.97
Poland	6.67
China	6.47
Turkey	5.89
Chile	5.86
Russia	5.77
Thailand	5.76
Argentina	5.60
South Africa	5.50
Mexico	5.45
Indonesia	4.78
Brazil	4.77
Colombia	4.72
India	4.61
Peru	4.60
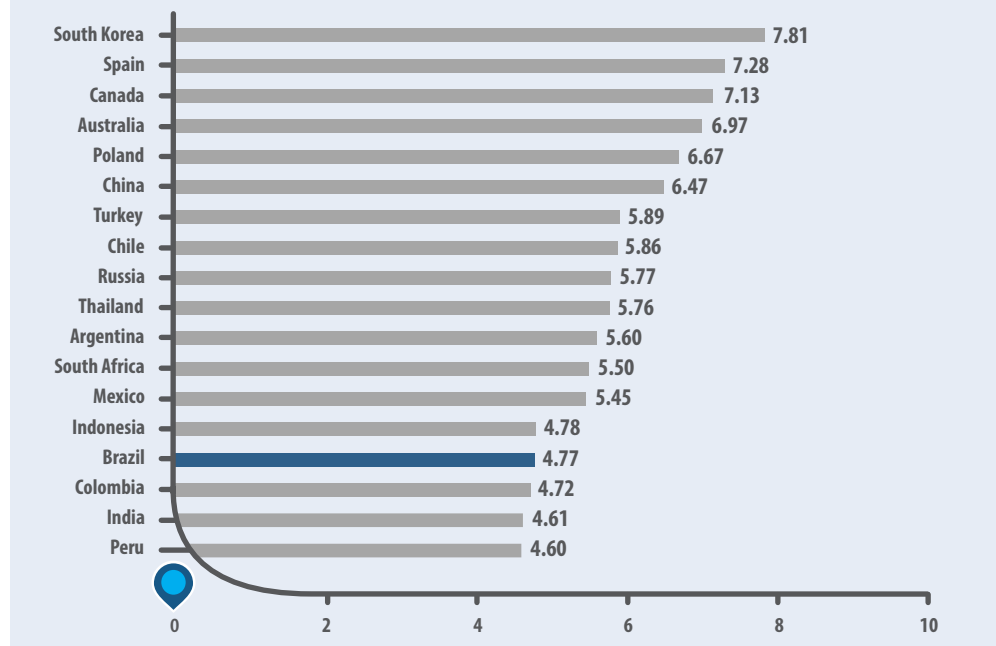
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.4 TAXATION

TAXATION
15th

Taxes
15th

Collected total
tax revenues
10th

Corporate
tax rates
17th

Total tax rate
(% of profit)
16th

Indirect
tax rates
9th

The ordinal number indicates the position
of Brazil in the set of 18 selected countries (if
not indicated otherwise).

● **Brazil is in the third of countries in a
more favorable position**
(positions 1-6)

● **Brazil is in the middle third**
(positions 7-12)

● **Brazil is in the bottom third of countries**
(positions 13-18)
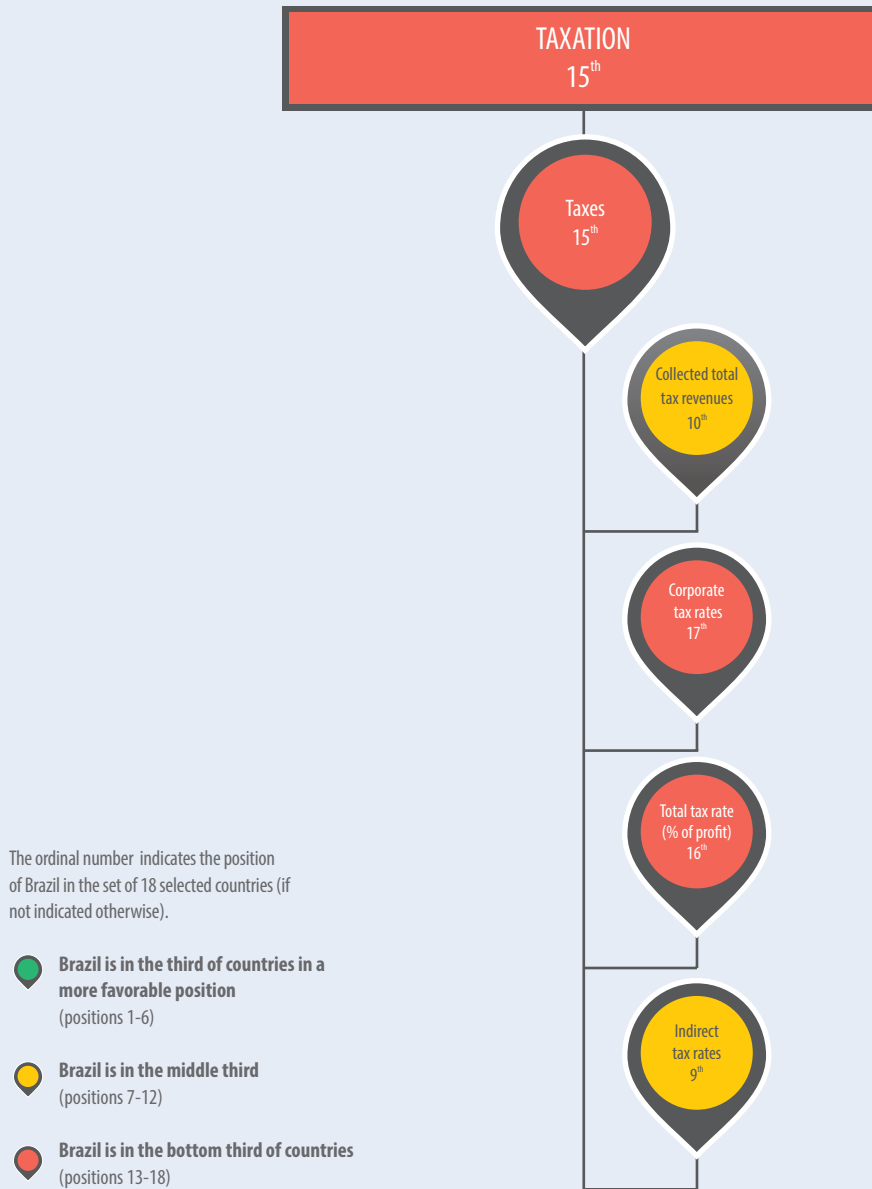
Loss of position in the ranking for corporate tax rates

In the ranking for the Taxation factor, Brazil was included in the bottom third among the 18 countries evaluated, occupying the 15th position.

This result is mainly due to Brazil's positions in the ranking for variables that measure corporate tax rates. In the ranking for Corporate tax rates, which is the accrued tax rate, Brazil

was ranked second to last with a rate of 34%, lower only than that observed in India (35%).

In Total tax rate (% of profit), total taxes and contributions paid by companies are measured as a percentage of profit. In Brazil, the percentage is 65.1%, which places it in the 16th position. The figure is much higher than that observed in most countries and 3 times higher than the one recorded in Canada (20.5%), the highest-ranking country[6].

In relation to the two other variables associated with the subfactor - Collected total tax revenues and Indirect tax rates - Brazil occupies an intermediate position in the ranking.

Compared with the revised 2017-2018 ranking, Brazil fell from 15th to 17th position in the variable Corporate tax rates, while Argentina, the lowest-ranking country in the previous ranking, moved up five positions. In the neighboring country, the cumulative rate decreased from 35% in 2017 to 30% in 2018 and will likely hit the mark of 25% in 2020[7].

It is worth noting that India, whose accumulated corporate tax rate rose from 34.61% in 2017 to 35% in 2018, was also surpassed by Argentina, falling to the last position in the Corporate tax rate subfactor. In the Indirect tax rates subfactor, India also recorded an increase in the cumulative rate, from 15% to 18%, over the same period.

In general terms, despite changes, Brazil and Argentina remained in the same positions in the Taxation factor (15th and 18th position, respectively). India fell in turn from 10th to 13th place, declining from the middle to the bottom third of the ranking.

FIGURE 9 - TAXATION FACTOR
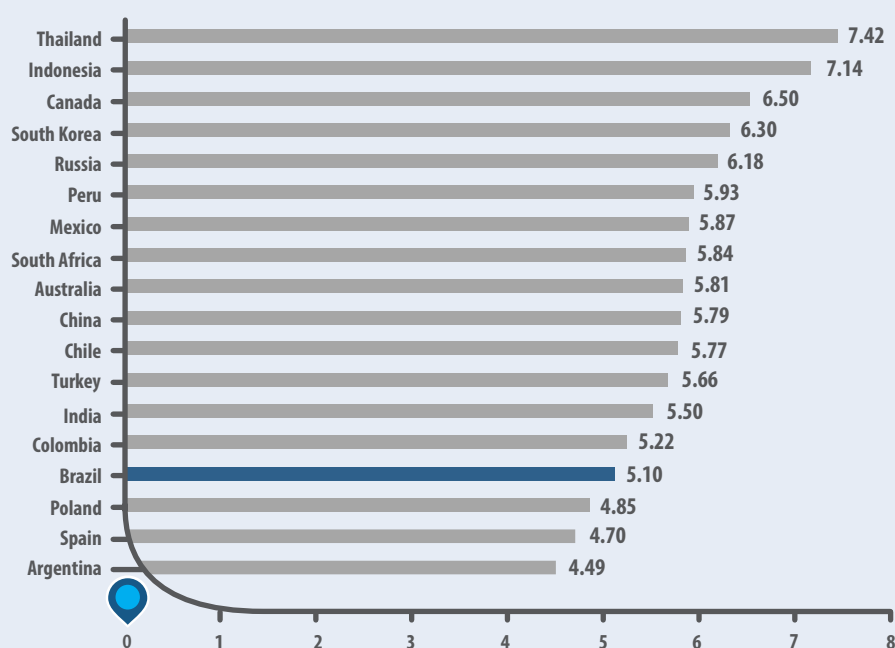
Thailand	7.42
Indonesia	7.14
Canada	6.50
South Korea	6.30
Russia	6.18
Peru	5.93
Mexico	5.87
South Africa	5.84
Australia	5.81
China	5.79
Chile	5.77
Turkey	5.66
India	5.50
Colombia	5.22
Brazil	5.10
Poland	4.85
Spain	4.70
Argentina	4.49

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.5 MACROECONOMIC ENVIRONMENT

FIGURE 10 - BRAZIL´s POSITION IN THE MACROECONOMIC ENVIRONMENT
FACTOR AND ASSOCIATED SUB-FACTORS AND VARIABLES

MACROECONOMIC ENVIRONMENT
16th

Macroeconomic indicators
16th

Inflation
10th

Gross fixed capital formation
17th

Direct investment flows inward
3rd

Real effective exchange rate
8th

General government debt
16th

General government net debt interest payments
18th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwis).

Brazil is in the third of countries in a more favorable position
(positions 1-6)

Brazil is in the middle third
(positions 7-12)

Brazil is in the bottom third
(positions 13-18)

Brazil's situation improves as inflation falls, but it is still in the bottom third of the ranking, with the second lowest investment rate

Brazil is in the bottom third of the ranking in the Macroeconomic environment factor, in which it was ranked 16th among 18 countries evaluated. A high gross debt and high interest rates and low investment rate play a decisive role in reducing the country competitiveness in this factor.

In the ranking for the General government debt variable, Brazil is in 16th place, ahead of Spain and Canada. In Brazil, General government debt accounted for 84% of GDP in 2017. In Spain, the percentage was 98.4% and in Canada it was 89.7% in the same year.

However, this gross debt-to-GDP ratio analysis must be complemented with debt cost data. Brazil's nominal interest spending is the highest among the 18 countries, amounting to 6.1% of GDP in 2017. In Spain and Canada, in turn, nominal interest spending accounted for 2.3% and 0.3% of GDP, respectively. In India, which was ranked 17th, just ahead of Brazil, interest spending accounted for 4.9% of GDP in 2017.

In relation to the investment rate, the performance of Brazil, with a rate of 15.6% in 2017, was the worst among the 18 countries with the only exception of Argentina, whose rate was 14.8%. The investment rate recorded in China and Indonesia, which are high-growth emerging countries, was 44.4% and 32.2%, respectively, in the same year.

Brazil's performance is so low in relation to that of other countries that the negative effect of these variables prevails. In the other variables associated with the factor, Brazil was only ranked in the top third of the ranking, in 3rd position, in the Direct investment flows inward variable. In relation to the inflation rate and to the evolution of the real exchange rate[8], the country was ranked in the middle third (10th and 8th position, respectively).

In the comparison with the revised 2017-2018 ranking, the fact that Brazil rose seven positions (to 10th place) and was included in the middle third for the Inflation rate variable deserves special mention. This result reflects a deceleration of the inflation rate in Brazil, which fell from 8.7% in 2016 to 3.4% in 2017.

Improvements were also recorded in the Real effective exchange rate variable, in which Brazil rose three positions (from 11th to 8th place). In the average monthly rates recorded over the last five years to December 2017, the Brazilian currency depreciated by 3.6% in real terms, while some of its competitors better positioned in the previous ranking recorded appreciation and lost positions. In the final calculation, Brazil rose from 18th to 16th place in the Macroeconomic Environment factor.

[8] This variable measures the extent to which the real exchange rate in December 2017 varied in relation to the average monthly rates observed in the last five years to December 2017. The interpretation is as follows: the more depreciated the exchange rate, the more it contributes positively to the competitiveness of countries.

FIGURE 11 - MACROECONOMIC ENVIRONMENT FACTOR

Country	Score
China	7.00
Turkey	6.61
Colombia	6.30
Indonesia	6.16
Australia	5.99
Mexico	5.98
South Korea	5.95
Russia	5.86
Peru	5.83
Canada	5.77
Chile	5.65
Thailand	5.59
Poland	5.20
India	5.15
Spain	5.15
Brazil	5.01
South Africa	4.87
Argentina	4.14
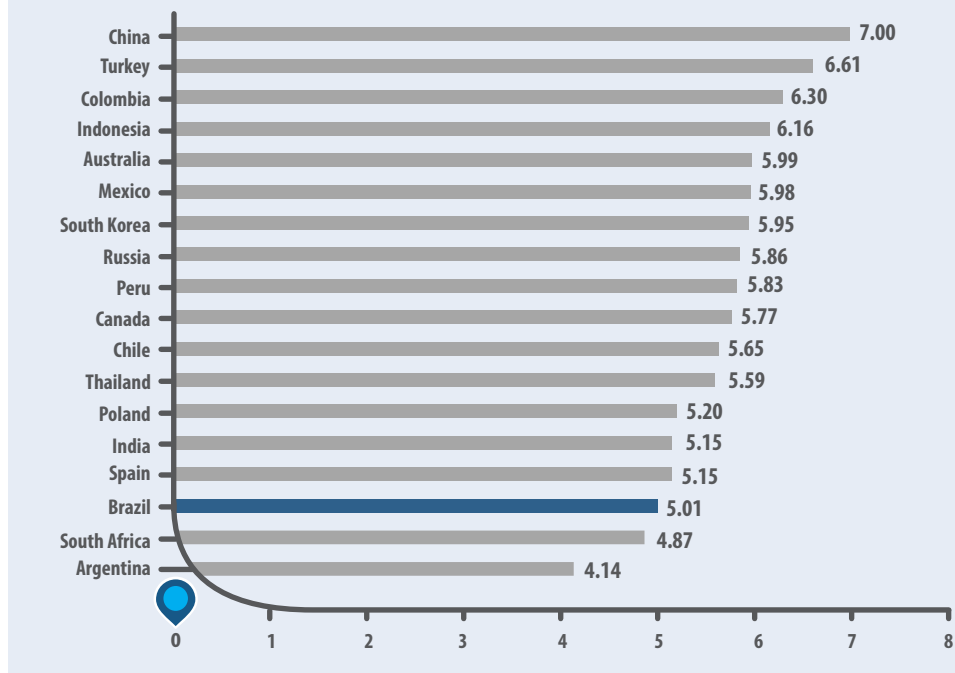
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.6 PRODUCTIVE STRUCTURE, SCALE AND COMPETITION

FIGURE 12 - BRAZIL´s POSITION IN THE PRODUCTION STRUCTURE, SCALE AND COMPETITION FACTOR AND ASSOCIATED SUB-FACTORS AND VARIABLES

PRODUCTIVE STRUCTURE, SCALE AND COMPETITION
12th

Productive structure
11th

Economic Complexity Index (ECI)
11th

Escale
4th

Domestic market size
4th

Competition
17th

Trade tariffs
16th

Extent of market dominance
9th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

Brazil is in the third of countries in a more favorable position
(positions 1-6)

Brazil is in the middle third
(positions 7-12)

Brazil is in the bottom third
(positions 13-18)

Brazil has the fourth largest domestic market, but was ranked in the bottom third in competition

In the Productive structure, scale and competition factor, Brazil was ranked in the middle third of the ranking, in 12th position among the 18 selected countries. The only subfactor in which the country was ranked in the bottom third, in the next-to-last position, was that of Competition.

Brazil obtained its best position in the Scale subfactor, in which it was included in the top third of the ranking, with the fourth largest domestic market. In Productive structure, the Economic Complexity Index (ECI) variable reflects the country's ability to produce a greater diversity of goods,

including complex products, namely, those that few countries are capable of producing. Brazil was included in the middle third of the ranking for this variable, in 11th place.

In relation to the Competition subfactor, the negative effect on the country's competitiveness reflects, above all, its performance in the Trade tariffs variable. In Extent of market dominance, a variable that is also associated with that subfactor based on perceptions about the concentration of companies, Brazil occupies an intermediate position (9th place).

Brazil recorded the third highest average tariff charged on imports of goods, 12.45% in 2017, higher than those recorded in Argentina and India, whose rates were, respectively, 12.70% and 14.88% in the same year. In South Korea, which occupies the 14th place in the ranking, the average rate is 9.04%. Both Spain and Poland were ranked first, with an average rate of 1.13%.

As compared to the revised 2017-2018 ranking, Brazil remained in the 12th position in the Productive structure, scale and competition factor. However, changes in positions in the variables of the Competition subfactor were recorded.

The country moved up one position in the Trade tariffs variable (from 17th to 16th position), switching places with Argentina. In the neighboring country, the average import tariff increased from 11.66% in 2016 to 12.70% in 2017. In Brazil, the average rate was 12.08% in 2016, rising to 12.45% in 2017. Despite this increase, it was still lower than that recorded in Argentina. In the ranking for the qualitative variable Extent of market dominance, the country moved down one position: from 8th to 9th place.

Special mention should be made of the progress made by Russia in the Productive structure, scale and competition factor, in which it rose from 11th to 8th position. The country recorded an improvement in the Economic Complexity Index in the Productive structure subfactor and in Competition a decline was recorded in the average import tariff. This improvement also reflects loss of positions by some of the other countries.

FIGURE 13 - PRODUCTIVE STRUCTURE, SCALE AND COMPETITION FACTOR

Country	Score
China	7.80
South Korea	7.56
Poland	7.55
Spain	7.28
Canada	7.20
Mexico	7.10
India	6.62
Russia	6.62
Thailand	6.56
Indonesia	6.46
Turkey	6.41
Brazil	6.06
Australia	5.95
South Africa	5.71
Chile	5.66
Colombia	5.65
Peru	5.15
Argentina	4.99
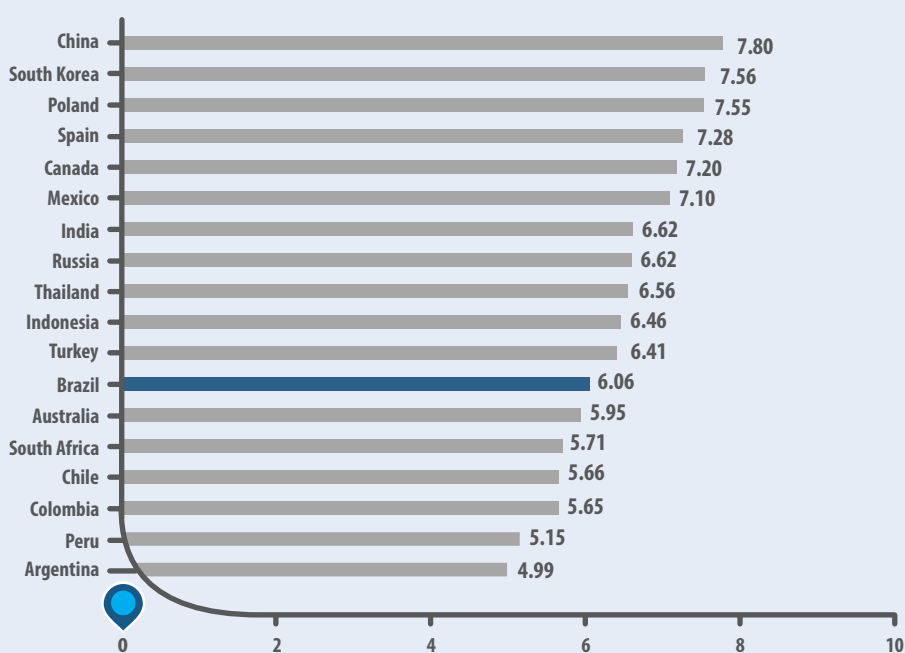
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.7 BUSINESS ENVIRONMENT

BUSINESS ENVIRONMENT
16th

Government Efficiency
9th

Control of corruption
16th

Regulatory quality
14th

Publicized laws and government data
3rd

Legal certainty
15th

Rule of Law
13th

Efficiency of legal framework in challenging regulations
16th

Enforcing contracts
9th

Red tape
18th

Starting a business
18th

Hiring and firing practices
18th

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

Brazil is in the third of countries in a more favorable position
(positions 1-6)

Brazil is in the middle third
(positions 7-12)

Brazil is in the bottom third
(positions 13-18)

Progress in Business environment with improvement in the variables related to red tape

Brazil was placed in the bottom third of the ranking in the Business Environment factor, ranking 16th among the 18 countries evaluated. Its unfavorable environment for business mainly reflects its lack of legal certainty and excessive red tape.

The Legal certainty factor assesses regulatory aspects with a direct impact on the private sector based on perceptions about ensuring compliance with legal standards (aspects related to enforcing contracts, property rights, law enforcement and justice) and how easy it is to question government actions and regulations through the legal system, and based on indicators for efficiency in enforcing contracts.

The only factor in which the country was not placed in the bottom third of the ranking (among the six last places) was that of Enforcing contracts, in which it ranked 9th. This variable was taken from the Doing Business 2019 survey and it is based on indicators for the efficiency of local courts in settling trade disputes and for the quality of practices adopted by the judicial system. In the other two variables, Brazil was placed among the lowest-ranking countries, in 15th place in the Legal certainty subfactor.

In relation to Red tape, Brazil was ranked last among the 18 countries evaluated. This subfactor is made up of two variables: Starting a business, which measures the time and cost involved in completing the procedures for starting a business, and Hiring and firing practices, a qualitative variable based on perceptions about the flexibility of hiring and firing practices. Brazil was ranked last in both variables.

The Business environment factor also includes the Government efficiency subfactor, which assesses the efficiency of how government operates based on perceptions about: the occurrence of acts of corruption by public officials; the quality of regulation and the ability to formulate and implement policies; and the availability of legal information and texts (aspects such as ease of means of dissemination, frequency and language).

This is the only subfactor in which Brazil was not included in the bottom third of the ranking and was ranked in an intermediate position (9th). This result is due to the positive performance of the country in the Publicized laws and government data variable, in which it got the third highest average score (0.72 on a 0-1 scale, where 1 is the highest score) among the 18 countries evaluated and was placed in the top third of the ranking. In the other variables associated to this subfactor, it was included in the bottom third of the ranking (six last places).

As compared to the previous ranking (revised 2017-2018 version), Brazil moved up one position in the Business environment factor, from 17th to 16th position, surpassing Peru, which fell from 16th to 18th place.

This improved position reflects improvements in the Red tape subfactor, the only one in which Peru is ahead of Brazil. The time required to complete procedures for starting a business in Brazil in working days fell from 79.5 to 20.5, according to data from the Doing Business 2018 and 2019 surveys. The score that rose the most for the country was that for the qualitative variable Hiring and firing practices. Despite this improvement, it remained in the last position in the Red tape subfactor. However, it reduced its distance from Peru, surpassing it in the final average of the Business environment factor. In relation to the other subfactors, Brazil lost positions.

In Government efficiency, Brazil declined from 8th to 9th position due to a deterioration in the qualitative variable Control of corruption, in which it moved down from 14th to 16th place, further increasing its gap in relation to the other countries. In the variable Publicized laws and government data, the country, which was already in the top third of the ranking, moved up from 6th to 3rd position.

In Legal certainty, it recorded lower scores on the two qualitative variables associated with the subfactor: Rule of law and Efficiency of legal framework in challenging regulations. As a result, it fell from 13th to 15th place in the ranking for the subfactor.

In relation to the other countries, special mention should be made of the fact that Argentina moved up seven positions in the Government efficiency subfactor, rising from 15th to 8th position, due to improvements in the qualitative variable Publicized laws and government data. In Legal certainty, it climbed five positions in the Rule of law variable also based on opinion polling, rising from 15th to 10th place. In both cases, it moved up from the bottom third to the middle third of the ranking.

FIGURE 15 - BUSINESS ENVIRONMENT FACTOR

Country	Score
Canada	8.47
Australia	8.20
South Korea	7.24
Chile	6.73
Spain	6.39
China	6.35
Thailand	6.05
Poland	5.97
India	5.92
Russia	5.61
Indonesia	5.53
South Africa	5.48
Mexico	5.45
Turkey	5.44
Colombia	5.10
Brazil	4.94
Argentina	4.94
Peru	4.82
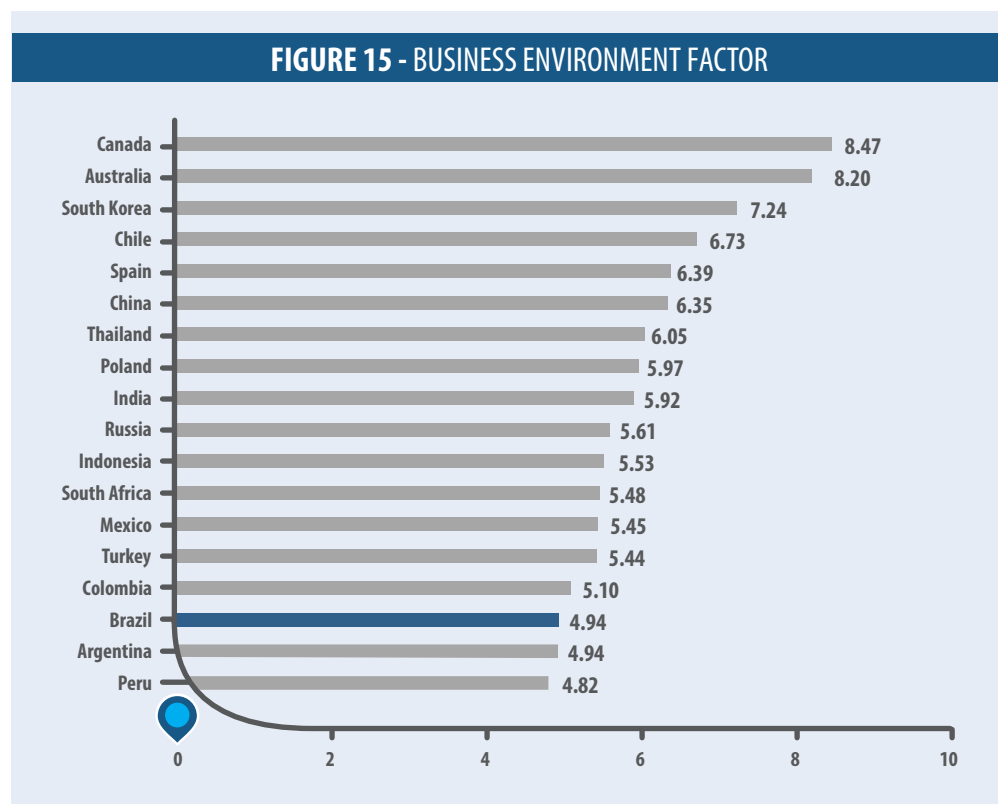
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.8 EDUCATION

FIGURE 16 - BRAZIL´s POSITION IN THE EDUCATION FACTOR AND ASSOCIATED SUB-FACTORS AND VARIABLES

EDUCATION
11th among 16

Educational attainment
12th among 14

Gross enrolment ratio in secondary education
9th among 17

Gross enrolment ratio in tertiary education
12th

Percentage of adults who have attained at least upper secondary education
11th among 14

Percentage of adults who have attained tertiary education
12th among 14

Educational assessment
12th among 14

Performance in mathematics
14th among 14

Performance in reading
12th among 14

Performance in science
13th among 14

Expenditure on education
4th among 17

Total public expenditure on education
2nd among 17

Total public expenditure on education per capita
6th among 17

The ordinal number indicates the position of Brazil in the set of 18 selected countries (if not indicated otherwise).

Brazil is in the third of countries in a more favorable position
(positions 1-6)

Brazil is in the middle third
(positions 7-12)

Brazil is in the bottom third
(positions 13-18)

Favorable result in spending has not translated into positive results in education attainment and educational assessment

In the Education factor, Brazil was ranked 11th among the 16 countries for which information is available[9] and was included in the middle third of the ranking.

This result is due to the positive performance of the country in the Expenditure on education subfactor, in which it was ranked 4th among the 17 countries considered[10]. In the other dimensions associated with the factor (educational attainment and educational assessment), Brazil was ranked in the bottom third (among the lowest-ranking countries).

Both in the variable that measures total public spending on education as a percentage of GDP and in the one that measures this spending in per capita terms, Brazil was included in the top third of the ranking (among the six highest-ranking countries). In 2016, the volume of funds allocated to education by Brazil accounted for 6.2% of GDP, less than the figure recorded in South Africa (7.0%).

The percentage of students enrolled in high school and in higher education placed Brazil in the middle third of the ranking for these variables. Nevertheless, the country was ranked in the last positions in terms of the percentage of the population aged between 25 and 64 that completed high school and higher education[11].

According to data from 2017, 15.7% of the Brazilian adult population completed tertiary education, a percentage that is only higher than that observed in Indonesia (11.9%). In Canada, which was ranked first, the percentage is 56.7%[12]. Thus, in the Education attainment subfactor, Brazil was ranked 12th among 14 countries considered[13].

With regard to performance in basic education, as reflected in the PISA 2015 assessments, Brazil occupies the 12th position among 14 countries. In the three knowledge areas assessed by PISA, Brazil was placed in the bottom third of the ranking[14].

As compared to the revised 2017-2018 ranking, Brazil fell from 10th to 11th place in the Education factor. In the Expenditure on education subfactor, the country was surpassed by South Korea, falling from 3rd to 4th position. The country also lost its previous position in the Gross enrollment ratio in tertiary education variable: it fell from 11th to 12th place. Most countries showed an increase in the percentage of enrolled students, while in Brazil this percentage declined.

[9] No information is available for China and India, which were excluded from the ranking for this factor.

[10] No information is available for Canada, which was excluded from the ranking for this subfactor.

[11] In the previous edition of the ranking, the adult population aged between 25 and 34 was considered. Due to unavailability of data, the current edition considers the adult population aged between 25 and 64 years old.

[12] In the case of Brazil, data from the National Household Sampling Survey (PNAD) conducted by the Brazilian Institute for Geography and Statistics (IBGE) is used. The age profile, in the case of Brazil, is of people aged 25 and above.

[13] No information is available for China, India, Thailand and Peru, which were excluded from the ranking for this subfactor.

[14] PISA (Program for International Student Assessment) consists in a survey conducted by the OECD at three-year intervals with 15-year-old students to assess their knowledge and skills in science, reading and math. In its last edition (2015), 72 countries participated in the survey. No data is available for Argentina, China, India and South Africa.

FIGURE 17 - EDUCATION FACTOR

Country	Score
Canada	8.30
Australia	7.30
South Korea	6.84
Poland	5.96
Russia	5.77
Spain	5.52
Chile	4.64
Argentina	4.23
South Africa	4.05
Turkey	3.59
Brazil	3.43
Colombia	3.41
Thailand	2.90
Mexico	2.75
Peru	2.34
Indonesia	2.21
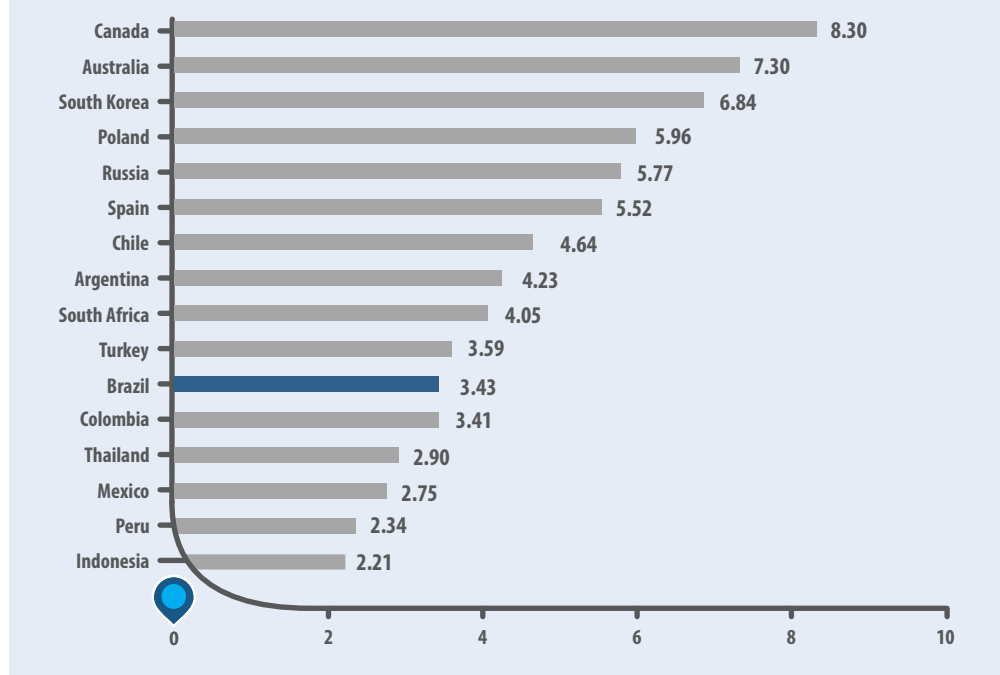
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

2.9 TECHNOLOGY AND INNOVATION

FIGURE 18 - BRAZIL´s POSITION IN THE TECHNOLOGY AND INNOVATION
FACTOR AND ASSOCIATED SUB-FACTORS AND VARIABLES

TECHNOLOGY AND INNOVATION
8th among 15

R&D efforts
6th among 15

Outcomes
of R&D efforts
9th

Gross
expenditure on
R&D (% of GDP)
5th

PCT international
applications
12th among 16

Gross
expenditure on
R&D financed by
business enterprise
8th among 15

Scientific and
technical
publications
9th

High-tech
exports
7th

The ordinal number indicates the position
of Brazil in the set of 18 selected countries (if
not indicated otherwise).

Brazil is in the third of countries in
a more favorable position
(positions 1-6)

Brazil is in the middle third
(positions 7-12)

Brazil is in the bottom third
(positions 13-18)

Brazil records a drop in R&D spending and is surpassed by Thailand in the Technology and innovation factor

In the Technology and innovation factor, Brazil was included in the middle third of the ranking, in 8th position among 15 countries considered[15]. In both dimensions evaluated in connection with this factor (research and development [R&D] efforts and outcomes), the country is in the middle third of the ranking.

[15] No information is available for India, Indonesia and Peru, which were excluded from the ranking.

In terms of R&D efforts, Brazil is among the highest-ranking countries in the Gross expenditure on R&D variable, which includes public and private spending. In 2016, the domestic volume of funds earmarked for R&D accounted for 1.27% of GDP, the fifth highest volume among all countries considered. In China, which is in second place in the ranking, this percentage was 2.11%.

In the variable Gross expenditure on R&D financed by business enterprise, which measures the share of the private sector in R&D investment in the country, Brazil is in an intermediate position in the ranking (8th place among the 15 countries considered). In 2015, the spending of Brazilian companies on R&D accounted for 45.5% of their total spending. In China and South Korea, the highest-ranking countries in this regard, corporate spending accounted for more than 70% of total expenditures.

Regarding Outcomes of R&D efforts, Brazil was ranked in the bottom third of the ranking (12th position among 16 countries considered) only in the PCT international applications variable[16]. In 2017, the number of international patent applications filed in Brazil under the Patent Cooperation Treaty (PCT) was 0.2 per billion GDP in Purchasing Power Parity (PPP)[17]. Among the countries assessed, those that filed the largest number of patent applications were the following ones: South Korea (7.8), China (2.1), Australia (1.5) and Canada (1.4).

The Outcomes of R&D efforts are also evaluated in light of the following variables: Scientific and technical publications, which measures the number of papers published in high-impact journals per billion GDP in PPP, and High-tech exports, which measures the share of exported high-tech products in total trade[18]. In the ranking for both variables, Brazil is in the middle third of the ranking (9th and 7th position, respectively).

As compared to the revised 2017-2018 ranking, Brazil was downgraded from 7th to 8th position in the Technology and innovation factor, while Thailand climbed four positions, rising to the top third of the ranking (from 9th to 5th position).

Brazil fell from 5th to 6th position in the R&D efforts subfactor. Despite remaining in the same position in the ranking for the variable Gross expenditure on R&D (% of GDP), the indicator for Brazil dropped from 1.34% in 2015 to 1.27% in 2016, slightly reducing its advantage over the average of countries.

This result also reflects the improved performance of Thailand, which recorded an increase in Gross expenditure on R&D and in the share of Gross expenditure on R&D financed by business enterprise, rising from 11th to 4th position in the R&D efforts subfactor.

In Outcomes of R&D efforts, Brazil climbed from 11th to 9th position, while Turkey was downgraded from 9th to 13th place. In the variable Scientific and technical publications, all the countries evaluated recorded a reduction in the number of published papers. Brazil moved up from 10th to 9th position due to the weaker performance of Turkey, which lost three positions and fell to 10th place.

In the PCT international applications variable, Brazil was downgraded from 11th to 12th position. The indicator for Brazil remained virtually the same, while Colombia was upgraded and surpassed Brazil, rising from 13th to 11th place.

[16] No information is available for Argentina and Indonesia.

[17] The PCT makes it possible to apply for patent protection for an invention in a large number of countries simultaneously by filing a single international patent application.

[18] The "high tech exports" variable is an approximate measure for the outcomes of innovation activities of companies, complementing patent-related data, which refers to inventions.

FIGURE 19 - TECHNOLOGY AND INNOVATION FACTOR

Country	Score
South Korea	9.12
China	6.32
Australia	4.86
Canada	3.91
Thailand	3.83
Spain	3.53
Poland	3.13
Brazil	2.98
Turkey	2.69
South Africa	2.43
Mexico	2.17
Russia	2.00
Chile	1.98
Colombia	1.98
Argentina	1.50
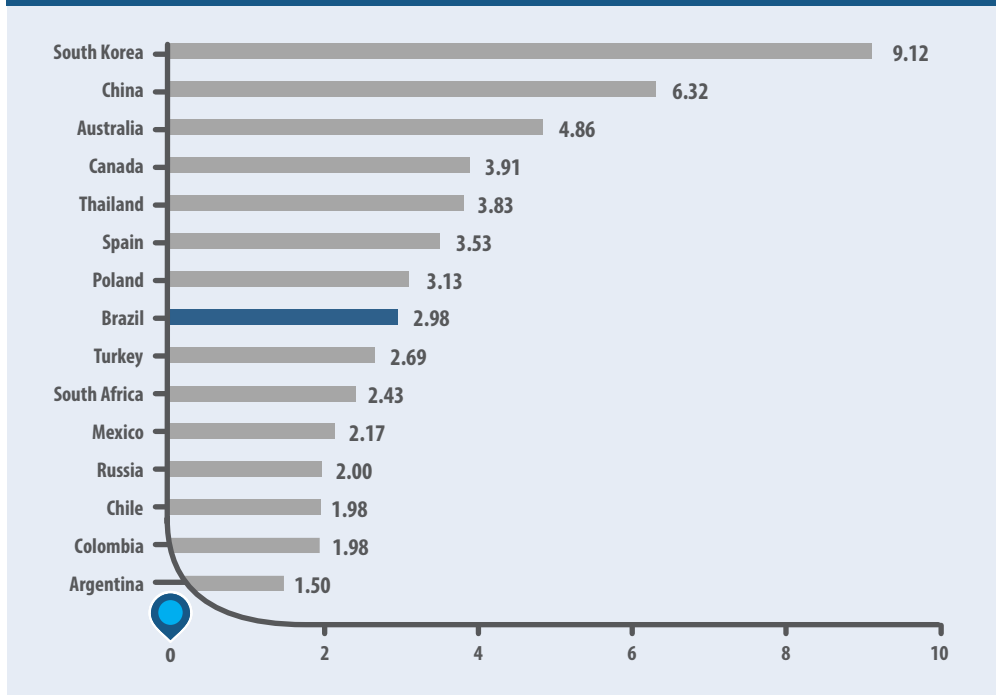
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance).

3. COMPETITIVE ADVANTAGES AND DISADVANTAGES OF BRAZIL IN RELATION TO EACH OF THE 17 SELECTED COUNTRIES

The graphs shown in this section compare the assessment of Brazil's performance versus that of each of the 17 selected countries, considering the nine factors with a bearing on the capacity of its companies.

The results of Brazil's assessment and that of a given country in relation to a specific competitiveness factor are shown in a spider-web graph. Each radius of the graph corresponds to one of the nine factors and originates in the center of the circumference. The factors are identified by an uppercase letter.

The further away from the center of the circumference, the better the country's performance in that competitiveness factor (on a 0-10 scale). The distance between two points in the same radius is an indication of the performance differential between Brazil and a given country, considering the competitiveness factor associated with the radius.

The colored lines associated with a country, which connect points in the different radiuses, have no specific meaning and correspond to one resource only, which allows for an overview of the position of the two countries in relation to the set of nine factors considered.

The indication of the axes associated with each of the competitiveness factors observed the correspondence indicated below:

L   availability and cost of labor

K   availability and cost of capital

G   infrastructure and logistics

F   taxation

M   macroeconomic environment

C   productive structure, scale and competition

N   business environment

E   education

T   technology and innovation

COMPETITIVENESS FACTORS

L availability and cost of labor

K availability and cost of capital

G infrastructure and logistics

F taxation

M macroeconomic environment

C productive structure, scale and competition

N business environment

E education

T technology and innovation

FIGURE 20 - BRAZIL – SOUTH AFRICA COMPARISON

Brazil
South Africa
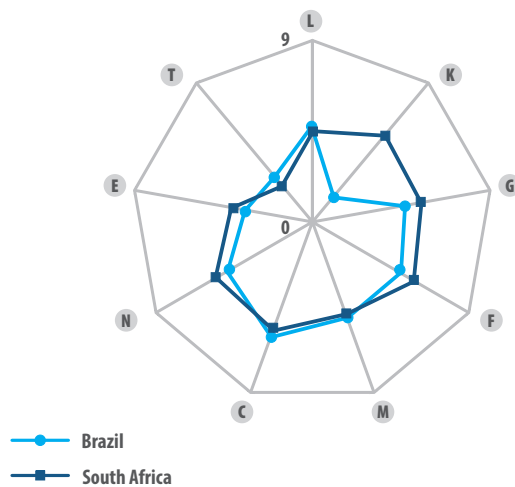
	Brazil	South Africa
Availability and cost of labor	4.8	4.5
Availability and cost of capital	1.6	5.7
Infrastructure and logistics	4.8	5.5
Taxation	5.1	5.8
Macroeconomic environment	5.0	4.9
Productive structure, scale and competition	6.1	5.7
Business environment	4.9	5.5
Education	3.4	4.0
Technology and innovation	3.0	2.4

FIGURE 21 - BRAZIL – ARGENTINA COMPARISON
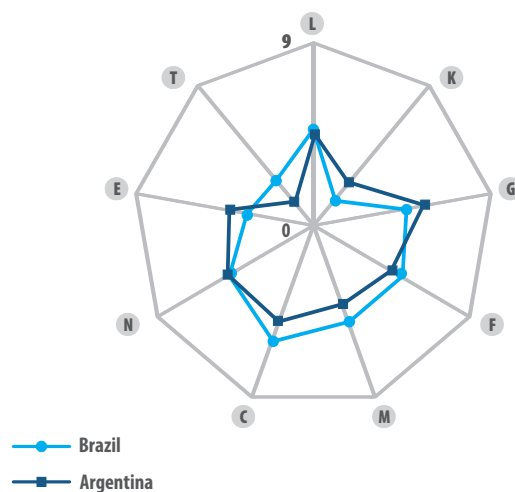
Brazil
Argentina

	Brazil	Argentina
Availability and cost of labor	4.8	4.4
Availability and cost of capital	1.6	2.7
Infrastructure and logistics	4.8	5.6
Taxation	5.1	4.5
Macroeconomic environment	5.0	4.1
Productive structure, scale and competition	6.1	5.0
Business environment	4.9	4.9
Education	3.4	4.2
Technology and innovation	3.0	1.5

FIGURE 22 - BRAZIL – AUSTRALIA COMPARISON
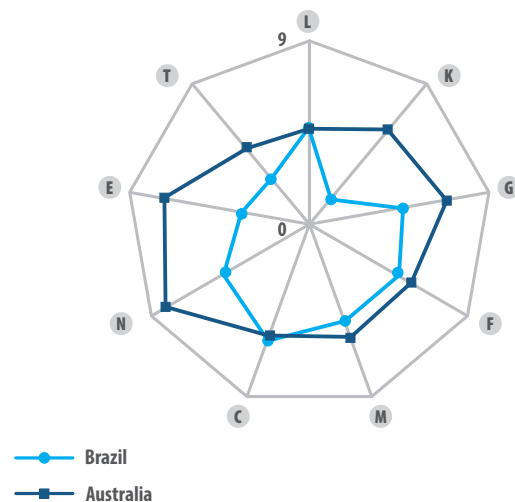
Brazil
Australia

	Brazil	Australia
Availability and cost of labor	4.8	4.6
Availability and cost of capital	1.6	6.2
Infrastructure and logistics	4.8	7.0
Taxation	5.1	5.8
Macroeconomic environment	5.0	6.0
Productive structure, scale and competition	6.1	5.9
Business environment	4.9	8.2
Education	3.4	7.3
Technology and innovation	3.0	4.9

FIGURE 23 - BRAZIL - CANADA COMPARISON
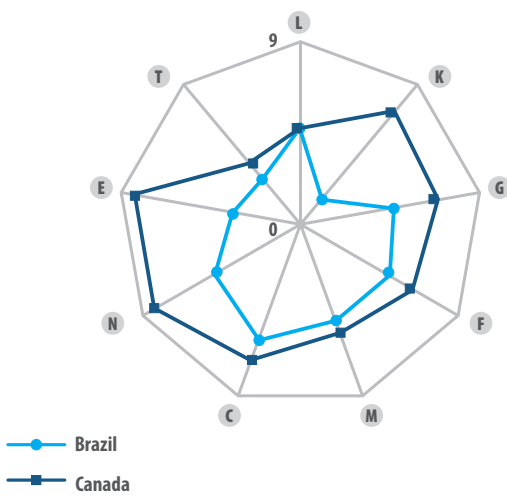
	Brazil	Canada
Availability and cost of labor	4.8	4.6
Availability and cost of capital	1.6	7.3
Infrastructure and logistics	4.8	7.1
Taxation	5.1	6.5
Macroeconomic environment	5.0	5.8
Productive structure, scale and competition	6.1	7.2
Business environment	4.9	8.5
Education	3.4	8.3
Technology and innovation	3.0	3.9

FIGURE 24 - BRAZIL - CHILE COMPARISON
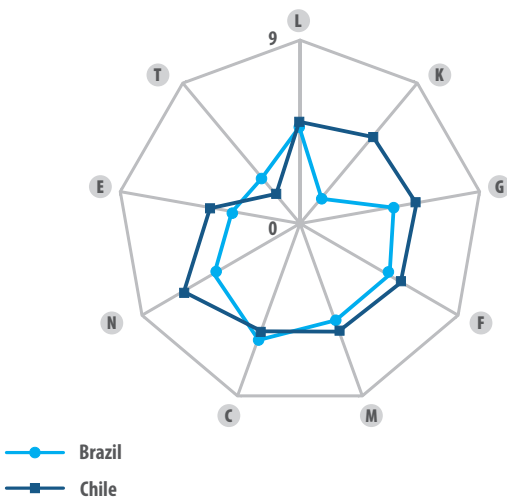
	Brazil	Chile
Availability and cost of labor	4.8	5.1
Availability and cost of capital	1.6	5.6
Infrastructure and logistics	4.8	5.9
Taxation	5.1	5.8
Macroeconomic environment	5.0	5.6
Productive structure, scale and competition	6.1	5.7
Business environment	4.9	6.7
Education	3.4	4.6
Technology and innovation	3.0	2.0

FIGURE 25 - BRAZIL - CHINA COMPARISON

	Brazil	China
Availability and cost of labor	4.8	4.7
Availability and cost of capital	1.6	6.0
Infrastructure and logistics	4.8	6.5
Taxation	5.1	5.8
Macroeconomic environment	5.0	7.0
Productive structure, scale and competition	6.1	7.8
Business environment	4.9	6.3
Education	3.4	
Technology and innovation	3.0	6.3

COMPETITIVENESS FACTORS

L availability and cost of labor

K availability and cost of capital

G infrastructure and logistics

F taxation

M macroeconomic environment

C productive structure, scale and competition

N business environment

E education

T technology and innovation

51

**COMPETITIVENESS
FACTORS**

L availability and cost of labor

K availability and cost of capital

G infrastructure and logistics

F taxation

M macroeconomic environment

C productive structure, scale and competition

N business environment

E education

T technology and innovation

FIGURE 26 - BRAZIL - COLOMBIA COMPARISON
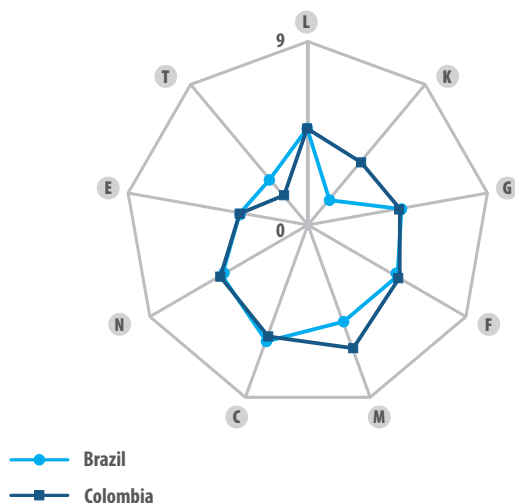
- Brazil
- Colombia

	Brazil	Colombia
Availability and cost of labor	4.8	4.9
Availability and cost of capital	1.6	4.1
Infrastructure and logistics	4.8	4.7
Taxation	5.1	5.2
Macroeconomic environment	5.0	6.3
Productive structure, scale and competition	6.1	5.7
Business environment	4.9	5.1
Education	3.4	3.4
Technology and innovation	3.0	2.0

FIGURE 27 - BRAZIL – SOUTH KOREA COMPARISON

- Brazil
- South Korea

	Brazil	South Korea
Availability and cost of labor	4.8	4.4
Availability and cost of capital	1.6	6.2
Infrastructure and logistics	4.8	7.8
Taxation	5.1	6.3
Macroeconomic environment	5.0	6.0
Productive structure, scale and competition	6.1	7.6
Business environment	4.9	7.2
Education	3.4	6.8
Technology and innovation	3.0	9.1

FIGURE 28 - BRAZIL – SPAIN COMPARISON
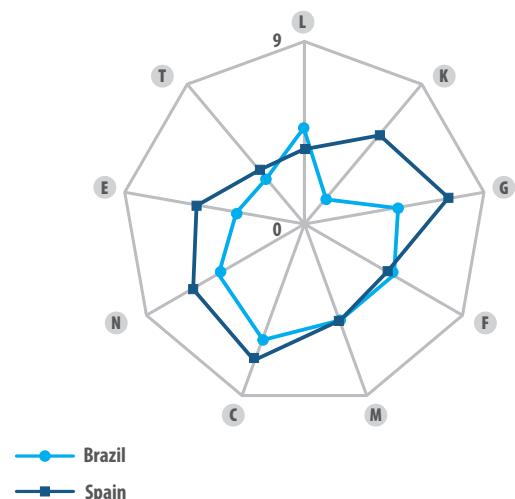
- Brazil
- Spain

	Brazil	Spain
Availability and cost of labor	4.8	3.8
Availability and cost of capital	1.6	5.8
Infrastructure and logistics	4.8	7.3
Taxation	5.1	4.7
Macroeconomic environment	5.0	5.2
Productive structure, scale and competition	6.1	7.3
Business environment	4.9	6.4
Education	3.4	5.5
Technology and innovation	3.0	3.5

FIGURE 29 - BRAZIL - INDIA COMPARISON
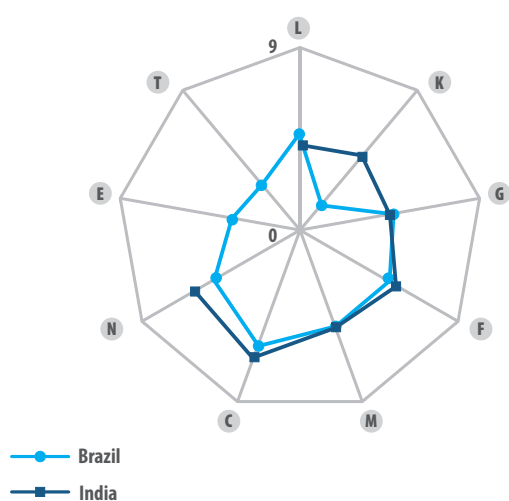
	Bzazil	India
Availability and cost of labor	4.8	4.3
Availability and cost of capital	1.6	4.8
Infrastructure and logistics	4.8	4.6
Taxation	5.1	5.5
Macroeconomic environment	5.0	5.2
Productive structure, scale and competition	6.1	6.6
Business environment	4.9	5.9
Education	3.4	
Technology and innovation	3.0	

Brazil
India

FIGURE 30 - BRAZIL - INDONESIA COMPARISON
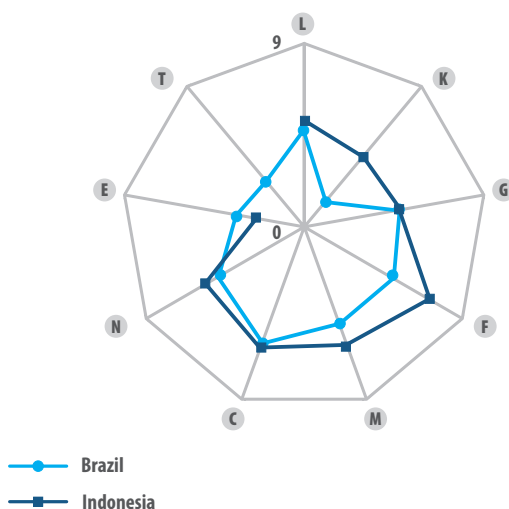
	Brazil	Indonesia
Availability and cost of labor	4.8	5.2
Availability and cost of capital	1.6	4.5
Infrastructure and logistics	4.8	4.8
Taxation	5.1	7.1
Macroeconomic environment	5.0	6.2
Productive structure, scale and competition	6.1	6.5
Business environment	4.9	5.5
Education	3.4	2.2
Technology and innovation	3.0	

Brazil
Indonesia

FIGURE 31 - BRAZIL - MEXICO COMPARISON
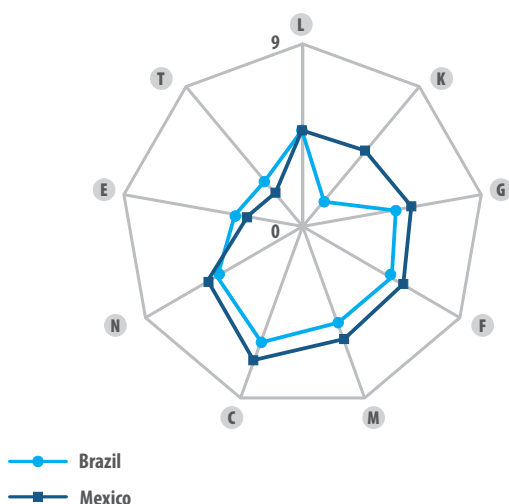
	Brazil	Mexico
Availability and cost of labor	4.8	4.7
Availability and cost of capital	1.6	4.8
Infrastructure and logistics	4.8	5.4
Taxation	5.1	5.9
Macroeconomic environment	5.0	6.0
Productive structure, scale and competition	6.1	7.1
Business environment	4.9	5.4
Education	3.4	2.7
Technology and innovation	3.0	2.2

Brazil
Mexico

COMPETITIVENESS

FACTORS

L   availability and cost of labor

K   availability and cost of capital

G   infrastructure and logistics

F   taxation

M   macroeconomic environment

C   productive structure, scale and competition

N   business environment

E   education

T   technology and innovation

COMPETITIVENESS FACTORS

L availability and cost of labor

K availability and cost of capital

G infrastructure and logistics

F taxation

M macroeconomic environment

C productive structure, scale and competition

N business environment

E education

T technology and innovation

FIGURE 32 - BRAZIL - PERU COMPARISON
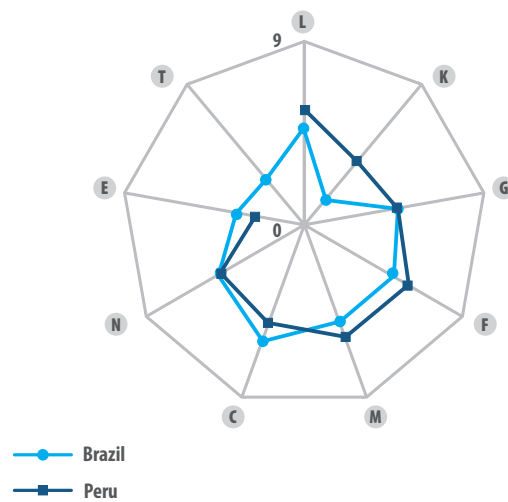
Brazil
Peru

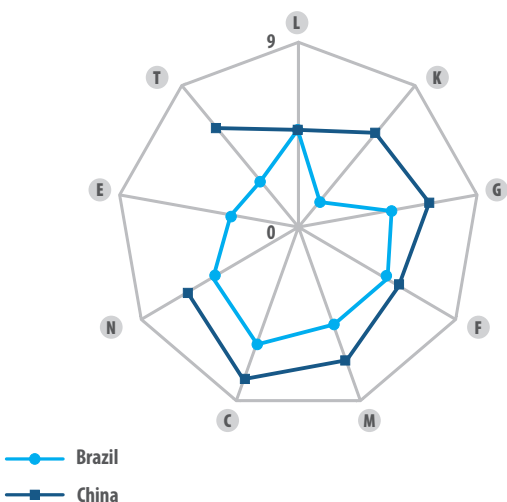|	Brazil	Peru
Availability and cost of labor	4.8	5.6
Availability and cost of capital	1.6	4.0
Infrastructure and logistics	4.8	4.6
Taxation	5.1	5.9
Macroeconomic environment	5.0	5.8
Productive structure, scale and competition	6.1	5.2
Business environment	4.9	4.8
Education	3.4	2.3
Technology and innovation	3.0	

FIGURE 33 - BRAZIL - POLAND COMPARISON
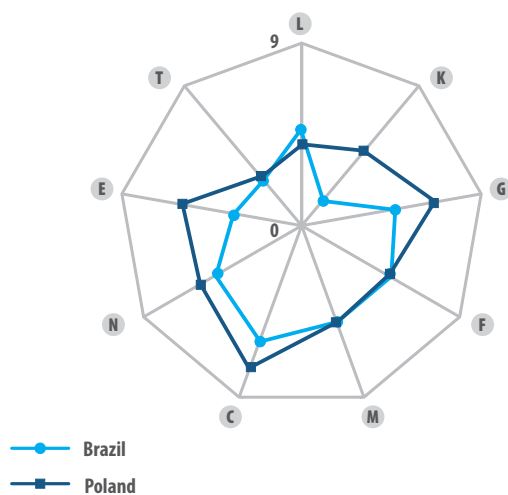
Brazil
Poland

	Brazil	Poland
Availability and cost of labor	4.8	4.0
Availability and cost of capital	1.6	4.8
Infrastructure and logistics	4.8	6.7
Taxation	5.1	4.8
Macroeconomic environment	5.0	5.2
Productive structure, scale and competition	6.1	7.5
Business environment	4.9	6.0
Education	3.4	6.0
Technology and innovation	3.0	3.1

FIGURE 34 - BRAZIL - RUSSIA COMPARISON
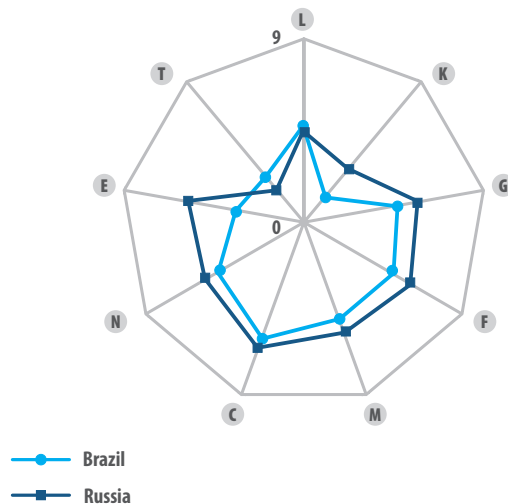
Brazil
Russia

	Brazil	Russia
Availability and cost of labor	4.8	4.5
Availability and cost of capital	1.6	3.6
Infrastructure and logistics	4.8	5.8
Taxation	5.1	6.2
Macroeconomic environment	5.0	5.9
Productive structure, scale and competition	6.1	6.6
Business environment	4.9	5.6
Education	3.4	5.8
Technology and innovation	3.0	2.0

FIGURE 35 - BRAZIL - THAILAND COMPARISON
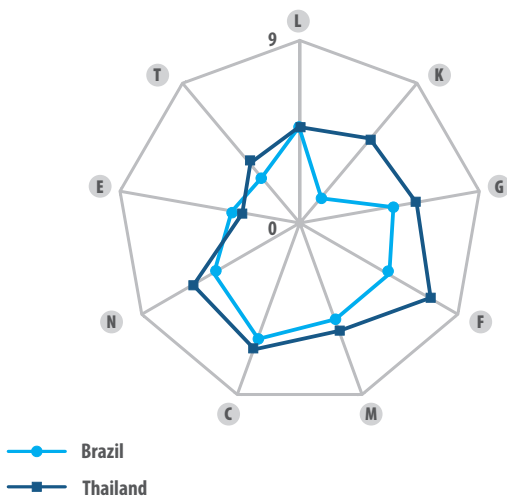
	Brazil	Thailand
Availability and cost of labor	4.8	4.7
Availability and cost of capital	1.6	5.4
Infrastructure and logistics	4.8	5.8
Taxation	5.1	7.4
Macroeconomic environment	5.0	5.6
Productive structure, scale and competition	6.1	6.6
Business environment	4.9	6.1
Education	3.4	2.9
Technology and innovation	3.0	3.8

Brazil
Thailand

FIGURE 36 - BRAZIL - TURKEY COMPARISON
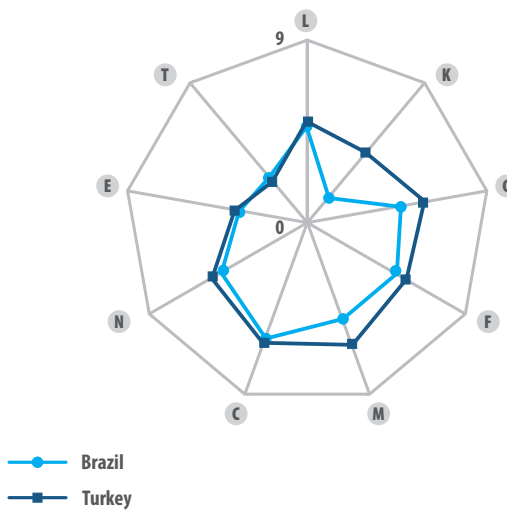
	Brazil	Turkey
Availability and cost of labor	4.8	5.1
Availability and cost of capital	1.6	4.6
Infrastructure and logistics	4.8	5.9
Taxation	5.1	5.7
Macroeconomic environment	5.0	6.6
Productive structure, scale and competition	6.1	6.4
Business environment	4.9	5.4
Education	3.4	3.6
Technology and innovation	3.0	2.7

Brazil
Turkey

COMPETITIVENESS

FACTORS
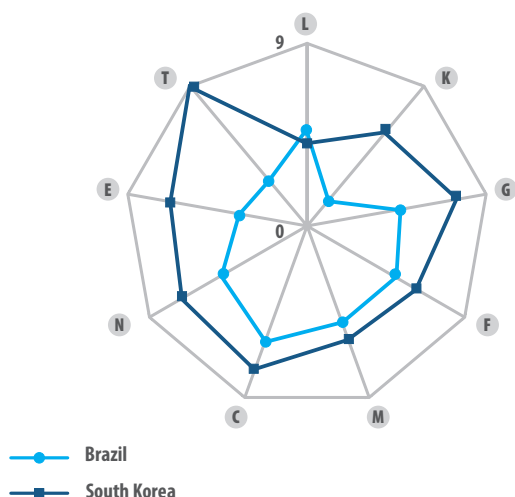
L availability and cost of labor

K availability and cost of capital

G infrastructure and logistics

F taxation

M macroeconomic environment

C productive structure, scale and competition

N business environment

E education

T technology and innovation

4. EVOLUTION OF COMPETITIVENESS FACTORS IN BRAZIL

Comparison of positions in the ranking

Figure 37 shows Brazil's positions in the rankings for the 22 competitiveness subfactors. The farther from the center of the circumference, the worse the ranking of the country in relation to that subfactor (positions from 1st to 18th). In the comparison between the revised 2017-2018 and 2018-2019 rankings, a shift toward the center of the figure indicates improved positions, suggesting that the subfactor contributed to increasing the competitiveness of Brazilian companies.

FIGURE 37 - EVOLUTION OF BRAZIL´S POSITION BETWEEN THE 2017-2018 AND 2018-2019 RANKINGS BY SUB-FACTORS

Ranking 2017-2018 (revised) Ranking 2018-2019
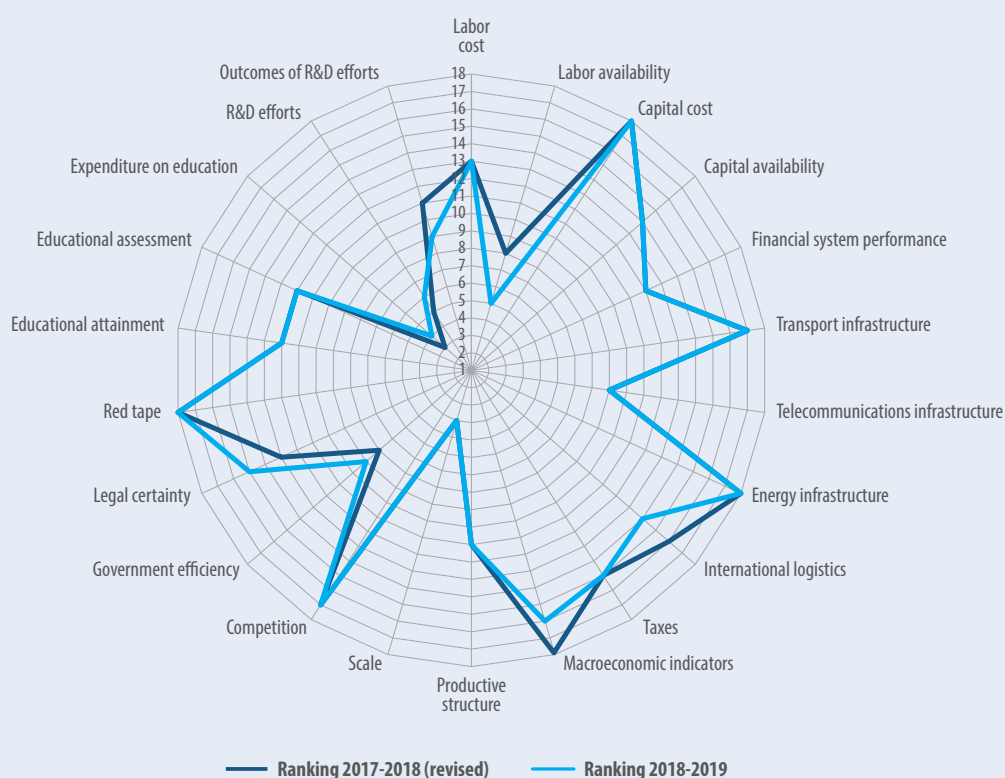
Among the 22 subfactors, Brazil's position improved in four cases, was downgraded in four others and remained the same in the other 14 cases. The country remained in the last position in three subfactors - Capital cost, Energy infrastructure and Red tape.

Subfactors in which Brazil was upgraded:

- Labor availability: it moved up three positions, reflecting a more intense labor force growth rate.

- International logistics: it climbed two positions due to a reduction in the cost to export and import according to requirements at the border, and in time to import.

- Macroeconomic indicators: It rose two positions as a result of a declining inflation rate and of the evolution of the real effective exchange rate, which recorded accumulated depreciation, while some of Brazil's competitors that obtained better positions in the previous ranking recorded appreciation and lost positions.

- Outcomes of R&D efforts: it climbed two positions as a result of the loss of positions by Turkey associated with a decline in the number of scientific and technical publications.

Subfactors in which Brazil was downgraded:

- Government efficiency: loss of one position, reflecting the country's poorer performance in the qualitative variable Control of Corruption.

- Legal certainty: loss of two positions due to a decline in the average scores for the two qualitative variables associated with the subfactor (Rule of law and Efficiency of legal framework in challenging regulations).

- Expenditure on education: the country recorded a reduction in the indicators for expenditure on education and dropped one position, being surpassed by South Korea.

- R&D efforts: loss of one position as a result of a decline in Gross expenditure on R&D (% of GDP), which reduced the gap between Brazil and the average of competing countries, and of the improved performance of Thailand.

Comparison between the values of the indicators

The graphs below are not referenced on positions, but rather on the values of the indicators associated with the 9 factors (Figure 38) and with the 22 subfactors (Figure 39). For each of these factors or subfactors, the values obtained for Brazil are compared to the average values corresponding to the 18 countries.

The horizontal axis shows the value assumed by the indicator for Brazil as a percentage of the average indicator, that is, the average of the values for the 18 countries covered in this report - clearly showing Brazil's relative position. Values above 100% indicate that Brazil is above average. Values below 100% indicate that Brazil is below average.

The vertical axis indicates, in percentage points, the difference between the growth rates recorded for the indicators obtained for Brazil and the average indicators of the 18 countries between the revised 2017-2018 and 2018-2019 rankings - clearly indicating whether improvements in this factor contributed to improving the competitiveness of Brazilian companies. When the difference is greater than zero, Brazil's variable grew above the average rate recorded for the 18 countries, that is, the competitiveness of Brazilian companies increased. Values below zero indicate loss of competitiveness.

FIGURE 38 - Comparison between Brazil´s performance and the average performance of the 18 countries by factor

QUADRANTES
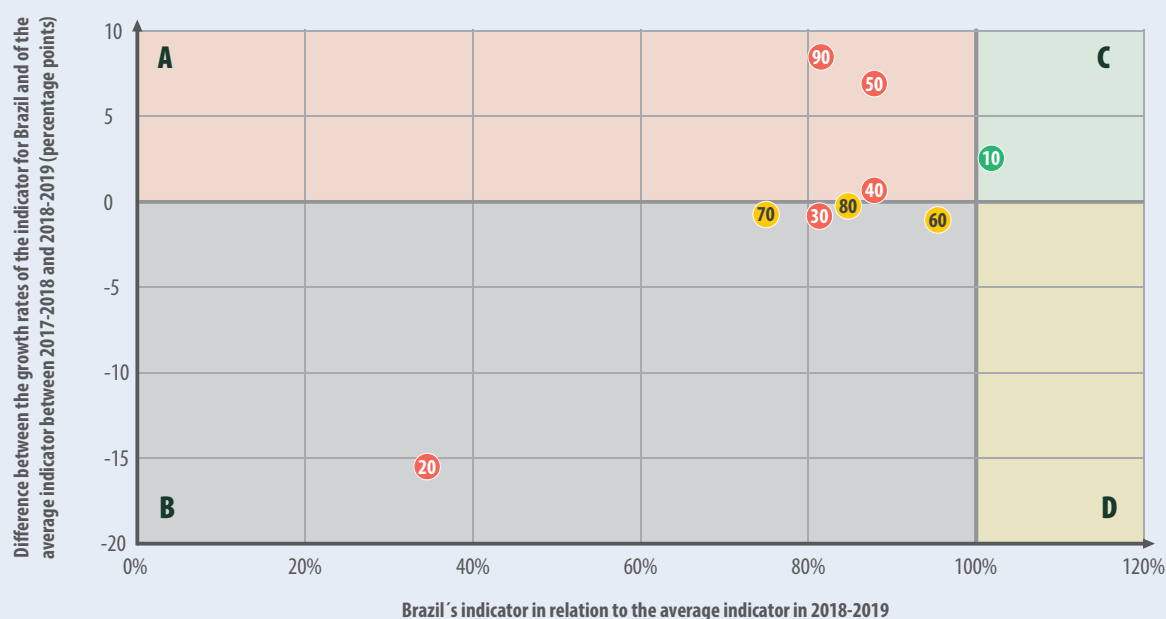
A - Brazil is regaining competitiveness	**C - Brazil has become more competitive**
40 Taxation	10 Availability and cost of labor
50 Macroeconomic environment	
90 Business environment	

B - Brazil´s low competitiveness worsens	**D - Brazil´s competitiveness is threatened**
20 Availability and cost of capital	
30 Infrastructure and logistics	
60 Productive structure, scale and competition	
70 Education	
80 Technology and innovation	

In the five factors in which Brazil was ranked in the bottom third of the ranking (red third), the value of the Brazilian indicator is lower than the average indicator. However, in three of them - Macroeconomic environment, Business environment and Taxation - Brazil is recovering its competitiveness (**quadrant A**). Quadrant A comprises the factors in which Brazil recorded a lower indicator than the average one, but its performance - as measured in terms of the growth rate of the indicator between the revised 2017-2018 and 2018-2019 rankings - is higher than the average performance.

Brazil is in **quadrant B** in the other two factors - Availability and cost of capital and Infrastructure and logistics. In this case, the country's low competitiveness is on the decline, that is, in addition to falling below the average, the growth rate of the Brazilian indicator is lower than the average of the indicators recorded for the selected countries. The factors Productive structure, scale and competition, Education and Technology and innovation, in which Brazil is in the middle third of the ranking, are also included in quadrant B.

Among the factors included in **quadrant A**, Brazil climbed positions in the ranking for the Macroeconomic environment and Business environment factors. In Taxation, it remained in 15th place, despite its favorable performance compared to the average of the countries.

Among the factors included in **quadrant B**, Brazil lost positions in Education and Technology and innovation. In Availability and cost of capital, it remained in the last position. Despite its negative performance in relation to the average of the countries, Brazil remained in the same position in Infrastructure and logistics and Productive Structure, scale and competition (15th and 12th place, respectively).

Brazil is more competitive than the average of its competitors in the Availability and cost of labor factor (in which it was ranked in the upper third of the ranking), as can be seen in **quadrant C**. In this case, the Brazilian indicator is 2% higher than the average indicator and decreased less than the average indicator (-6.5% against -8.9%) over the period, that is, Brazil is reinforcing its competitive advantage.

Finally, it should be mentioned that Brazil has no factor in **quadrant D**. This quadrant includes cases in which Brazil is more competitive than the average of its competitors, but the country's indicators show lower growth during the period under consideration.

Figure 39 shows the same exercise for the 22 subfactors. Most of them (73%) fall under **quadrants A and B**, in which the Brazilian indicator is lower than the average indicator, that is, Brazil is less competitive than the average. In half of these factors, Brazil is reducing its competitiveness gap, that is, the Brazilian indicator grew more (or fell less) than the average indicator over the period (**quadrant A**). In the other half, Brazil's lack of competitiveness is worsening, since the Brazilian indicator showed a lower growth rate over the period (**quadrant B**).

FIGURE 39 - Comparison between Brazil´s performance and the average performance of the 18 countries by sub-factors
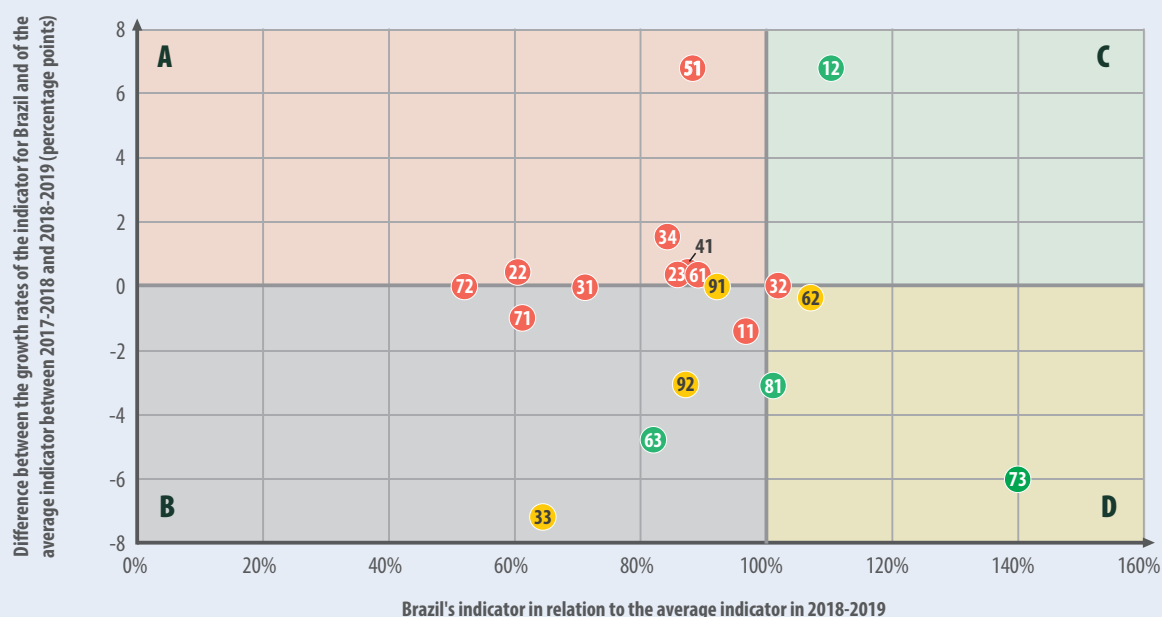
Note: The following sub-factors were not shown, since their values are very distant from the others: **21** (0%, -109), **82** (69%, 20) and **93** (68%, 43).

QUADRANTES

A - Brazil is regaining competitiveness	C - Brazil has become more competitive
22 Capital availability	12 Labor availability
23 Financial System performance	
34 International logistics	
41 Taxes	
51 Macroeconomic indicators	
61 Productive structure	
82 Outcomes of R&D efforts	
93 Red tape	

B - Brazil´s low competitiveness worsens	D - Brazil´s competitiveness is threatened
11 Labor cost	62 Scale
21 Capital cost	73 Expenditure on education
31 Transport infrastructure	81 R&D efforts
33 Energy infrastructure	
71 Educational attainment	**Not ranked**
63 Competition	32 Telecommunications infrastructure
91 Government efficiency	72 Educational assessment
92 Legal certainty	

Brazil is more competitive than the average of its competitors in four subfactors, as shown in **quadrants C and D**. In only one of them - Labor availability - the Brazilian indicator improved more than the average indicator (**quadrant C**). In this case, the Brazilian indicator is 10% higher than the average indicator and experienced a smaller decrease (-12.3% against -19.1%) over the period.

Brazil's competitiveness is under threat in the Scale, Expenditure on education and R&D Efforts subfactors (**quadrant D**). In these cases, Brazil is more competitive than the average of its competitors, but its indicators improved less than the average indicators over the period. Brazil experienced low growth rates in its domestic market and a reduction in expenditure on education and research and development and is at risk of being outperformed by its competitors. These cases represent 14% of all the subfactors.

5. METHODOLOGICAL NOTE

About the report

CNI's agenda places priority on increasing the competitiveness of industry and, consequently, of the Brazilian economy. This is the focus behind the motivation to draw up the **Competitiveness Brazil: comparison with selected countries** report, which was first published in 2010. Since then, the following editions had been published: 2012, 2013, 2014, 2016 and 2017-2018 editions.

The reporting period for this report is 2018 or the year for which the latest data is available for each variable and country. In most cases, data for 2017 is the most up-to-date, but data for 2016 and 2015 is used in some cases[19].

The increasing attention given to the topic of competitiveness has increased the number of studies and research into the determinants of the competitiveness of companies in a country. This effort has led to the periodic publication of reports comparing the competitiveness of countries from this perspective.

This report is one of such studies and it focuses on:

- A limited set of countries that, because of their economic and social characteristics and/or their position in the international market, provide a more appropriate benchmark for assessing the competitive potential of Brazilian companies;

- A specific set of variables more directly related to the reality of this set of countries selected from variables included in reports published by international organizations.

Factors with a bearing on competitiveness and associated variables

The term competitiveness refers to a company's ability to compete in the market - that is, to its ability to outperform competitors in winning consumer preference. Companies are basically provided with two mechanisms to win consumer preference: price and quality.

The competitive potential of an economy can be assessed by analyzing factors with a bearing on the ability of its companies to manage these competition mechanisms effectively. For this purpose, the following aspects must be considered:

- Factors with a direct bearing on the efficiency of companies and on how effectively they manage those instruments, such as:

  o   Availability and cost of labor;

  o   Availability and cost of capital;

  o   Infrastructure and logistics;

  o   Taxation;

  o   Technology and innovation.

[19] See section 7 for the rankings for variables with an indication of the reference year of each variable.

● Factors with a bearing on the previous ones and which indirectly affect the performance of companies, such as:

  o Macroeconomic environment;

  o Productive structure, scale and competition;

  o Business environment;

  o Education.

These factors were divided into 22 subfactors, to which 62 variables were associated. The starting point for assessing the competitiveness of Brazilian companies is the value assumed by these 62 variables in Brazil and in 17 other countries. This set of variables comprises 48 economic variables disseminated in international and national databases, as well as 14 qualitative variables.

The qualitative variables were derived from surveys conducted by international organizations and disseminated in the following reports: *The Global Competitiveness Report prepared by the World Economic Forum; IMD World Competitiveness Yearbook prepared by the IMD; The WJP Rule of Law Index prepared by The World Justice Project (WJP); The Worldwide Governance Indicators and Connecting to Compete 2018 - Trade Logistics in the Global Economy*, both prepared by the World Bank.

Table 1 shows the distribution of variables according to their factors and subfactors. A list of the 62 variables with their definition and corresponding sources can be found in section 6 of this report.

TABLE 1 - THE 2018-2019 REPORT: FACTORS, SUB-FACTORS AND VARIABLES	WEIGHT
Availability and cost of labor	
Labor cost	50%
Compensation levels in manufacturing	50%
Labor productivity in industry	50%
Labor availability	50%
Labor force participation rate	50%
Labor force growth	50%
Availability and cost of capital	
Capital cost	33.3%
Interest rate spread	50%
Real short-term interest rate	50%
Capital availability	33.3%
Domestic credit to private sector	33.3%
Stock market size	33.3%
Venture capital availability	33.3%
Financial system performance	33.3%
Banking sector assets	50%
Country credit rating	50%
Infrastructure and logistics	
Transport infrastructure	25%
Quality of roads	12.5%
Road connectivity index	12.5%
Efficiency of train services	12.5%

TABLE 1 - THE 2018-2019 REPORT: FACTORS, SUB-FACTORS AND VARIABLES	WEIGHT
Railroad density	12.5%
Efficiency of seaport services	12.5%
Liner shipping connectivity	12.5%
Efficiency of air transport services	12.5%
Air transport, freight	12.5%
Energy infrastructure	25%
Electricity costs for industrial clients	33.3%
Availability of electricity	33.3%
Quality of electricity supply	33.3%
Telecommunications infrastructure	25%
ICT use	50%
ICT access	50%
International logistics	25%
Logistic Performance Index (LPI)	50%
Time and cost to export and import	50%
Taxation	
Taxes	100%
Collected total tax revenues	25%
Corporate tax rates	25%
Total tax rate (% of profit)	25%
Indirect tax rates	25%
Macroeconomic environment	
Macroeconomic indicators	100%
Inflation	20%
Gross fixed capital formation	20%
Direct investiment flows inward	20%
Real effective exchange rate	20%
General government debt	10%
General government net debt interest payments	10%
Productive structure, scale and competition	
Productive structure	33.3%
Economic Complexity Index (ECI)	100%
Scale	33.3%
Domestic market size	100%
Competition	33.3%
Trade tariffs	50%
Extent of market dominance	50%
Business environment	
Government Efficiency	33.3%
Control of corruption	33.3%
Regulatory quality	33.3%
Publicized laws and government data	33.3%
Legal certainty	33.3%
Rule of Law	33.3%
Efficiency of legal framework in challenging regulations	33.3%
Enforcing contracts	33.3%
Red tape	33.3%
Starting a business	50%
Hiring and firing practices	50%

TABLE 1 - THE 2018-2019 REPORT: FACTORS, SUB-FACTORS AND VARIABLES	WEIGHT
Education	
Educational attainment	33.3%
Gross enrollment ratio in secondary education	25%
Gross enrollment ratio in tertiary education	25%
Percentage of adults who have attained at least upper secondary education	25%
Percentage of adults who have attained tertiary education	25%
Educational assessment	33.3%
Performance in mathematics	33.3%
Performance in readinga	33.3%
Performance in science	33.3%
Expenditure on education	33.3%
Total public expenditure on education	50%
Total public expenditure on education per capita	50%
Technology and innovation	
R&D efforts	50%
Gross expenditure on R&D (% of GDP)	50%
Gross expenditure on R&D financed by business enterprise (% of total R&D expenditure)	50%
Outcomes of R&D efforts	50%
PCT international applications	33.3%
Scientific and technical publications	33.3%
High-tech exports	33.3%

Countries selected as a benchmark for assessing the competitiveness of the Brazilian economy

The competitive potential of the Brazilian economy was assessed as a function of Brazil's relative position vis-à-vis selected countries. An effort was made to select countries at a similar level of development and/or of a similar size to Brazil, countries that compete with Brazil in third markets or with international activities similar to those of Brazil and neighboring countries.

This set of countries includes: South Africa, Argentina, Australia, Canada, Chile, China, Colombia, South Korea, Spain, India, Indonesia, Mexico, Peru, Poland, Russia, Thailand and Turkey.

The table below shows some structural characteristics of these economies.

TABLE 2 - STRUCTURAL CHARACTERISTICS OF THE SELECTED COUNTRIES - 2017						
Country	Area (thousand sq. km)	Population (millions)	GDP (billion USD)	GDP per capita, PPP (thousand USD)	Agricultural products exports (billion USD)	Total exports (billion USD)	Total imports (billion USD)
South Africa	1,219	57	349	13.6	12	89	101
Argentina	2,780	44	638	20.9	36	58	67
Australia	7,741	25	1,380	50.4	42	231	229
Brazil	**8,516**	**208**	**2,055**	**15.6**	**88**	**218**	**158**
Canada	9,985	37	1,653	48.4	67	421	442
Chile	756	18	277	24.6	21	69	65
China	9,563	1,390	12,015	16.7	76	2,263	1,844
Colombia	1,142	49	314	14.4	7	38	46
South Korea	100	51	1,540	39.5	13	574	478
Spain	506	46	1,314	38.4	57	320	352
India	3,287	1,317	2,602	7.2	39	299	447
Indonesia	1,911	262	1,015	12.4	49	169	157
Mexico	1,964	124	1,151	19.9	33	409	432
Peru	1,285	32	214	13.5	9	45	40
Poland	313	38	525	29.6	33	231	231
Russia	17,098	144	1,578	27.9	34	354	238
Thailand	513	69	455	17.9	43	237	222
Turkey	785	81	852	27.0	17	157	234

Source: World Development Indicators, World Bank; World Economic Outlook Database, Oct. 2018, IMF; WTO merchandise trade values annual dataset, World Trade Organization.

Procedures adopted

The effect of each of the 62 variables from the point of view of the competitiveness of Brazilian companies can be assessed based on Brazil's position in the list of countries, defined according to the values of these variables in each of the 18 countries.

The 62 variables were aggregated into 22 subfactors and the subsequent aggregation of these subfactors into nine factors makes it in turn possible to assess the effect of each of these subfactors and factors on the competitiveness of Brazilian companies. This aggregation process was carried out through the procedures described below.

The set of 62 variables comprises quantitative variables that reflect economic magnitudes, as well as qualitative variables derived from polls.

The qualitative variables are based on different scales, as they were derived from different polls. Such scales were converted into a single scale (a 0-10 scale).

Calculation of comparable measures (normalization)

The quantitative variables measure different quantities and, in many cases, are expressed in different units. Following the procedure adopted in *The Global Competitiveness Report prepared by the World Economic Forum*, these variables were normalized and converted into the same scale used for the variables derived from polls using the following formula:

$$VN^v_i = \frac{10 \times (V_i - V_{min})}{(V_{max} - V_{min})} \qquad (1)$$

Where: VN^v_i is the normalized value of variable V of the country i; V_{max} and V_{min} are the maximum and minimum values in the original sample of countries from which the values for the 18 selected countries were derived, that is, the highest and lowest values observed, and V_i is the country`s value i.

In the case of variables for which the most favorable result is the lowest from the point of view of competitiveness, the following formula was adopted:

$$VN^v_i = 10 - \frac{10 \times (V_i - V_{min})}{(V_{max} - V_{min})} \qquad (2)$$

Aggregation of variables into subfactors and factors

The scores of the subfactor are the weighted average of the normalized variables associated with the sub-factor (the weights are shown in table 1, on page 72). Factor scores were determined by the simple average of the scores of subfactors associated with them.

The position of the countries in the general ranking is determined by the simple average of the nine factor scores.

FIGURE 40 - AGGREGATION PROCESS

To calculate the annual Competitiveness Brazil ranking, it is necessary to collect data for the 62 variables and to check the availability of data for the 18 selected countries.

In some cases, no information is available for a country for some of the variables in the reference year, i.e. the last year for which data is available. In such cases, the most recent available data is repeated for the reference year. For example, if the reference year of a given variable is 2017 and the most recent data available for the country is from 2016, the value recorded in 2016 is repeated for 2017.

When data for a country is very outdated or not available for a country in any year of the series for any variable, the missing data is excluded from the calculation of the subfactor scores. The weighted average of the available normalized variables is then calculated (the weight assigned to the missing data is equally redistributed in the variables that remain).

However, if over 50% of the variables making up a subfactor are excluded, the country score in the subfactor is not calculated. At the factor level, if over 50% of the scores of the subfactors making up a factor are excluded, the country score in the factor is not calculated.

In determining the general ranking, if a country has no score for any of the nine factors, this missing value is estimated. This is, for example, the case of China in the 2018-2019 ranking, in which it has no score in the Education factor. Scores are estimated according to the following methodology:

a) the scores for the Education factor are calculated based on the simple average of the values of the variables for which information is available for China;

b) a new ranking for the Education factor is calculated based on the scores calculated in item a. It is a new ranking because it is based only on the variables for which information is available for China;

c) the score that is consistent with China's position calculated in item b is checked in the original ranking;

d) a simple average is calculated to estimate China's score based on the score calculated in item c and on the scores assigned to countries in neighboring positions.

The cases of countries with missing data in the 2018-2019 general ranking are the following ones: China and India in the Education factor; India, Indonesia and Peru in the Technology and Innovation factor.
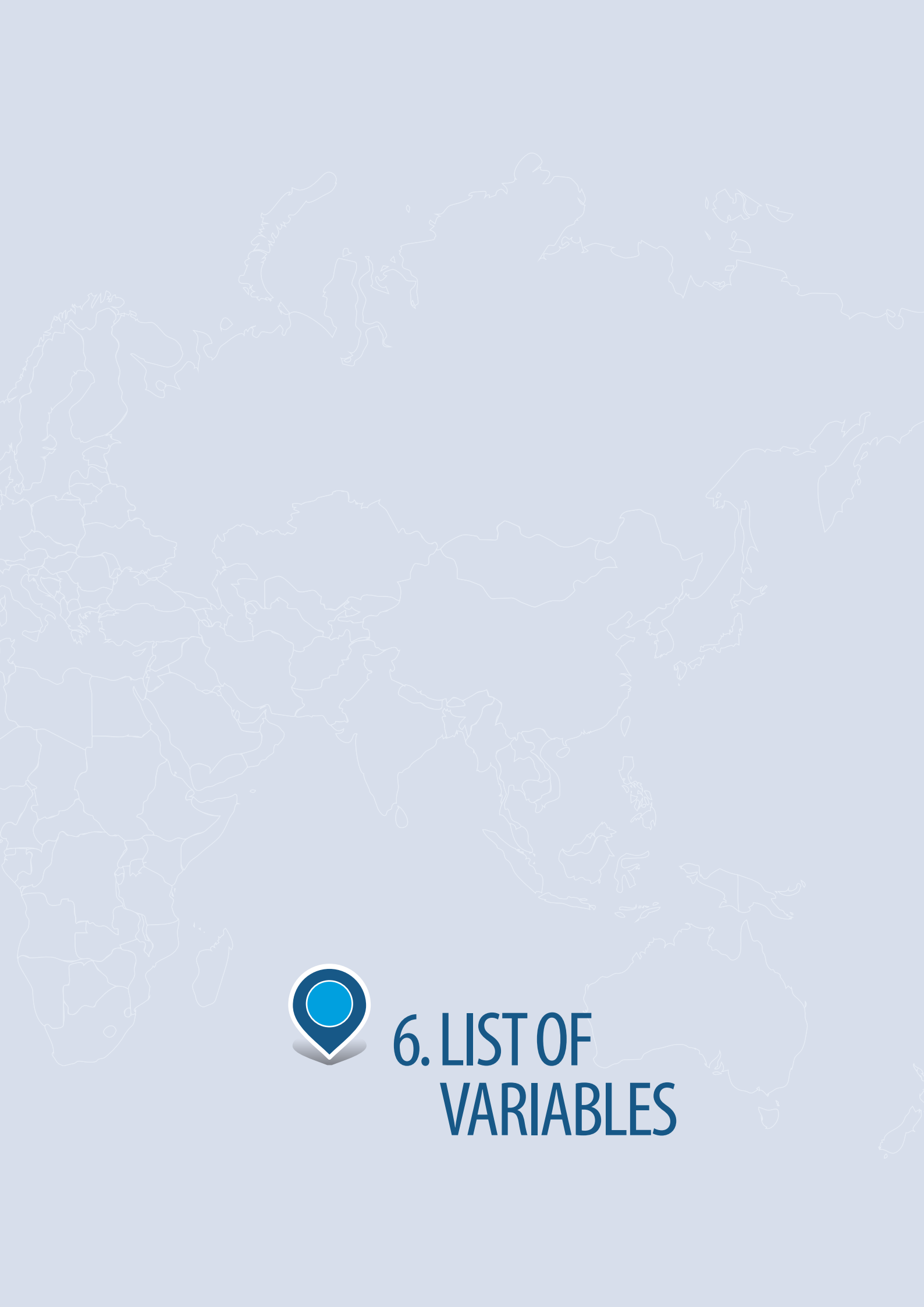
6. LIST OF VARIABLES

Description and source of the variables

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Availability and cost of labor		
Labor cost		
Compensation levels in manufacturing	Total hourly compensation in manufacturing (wages plus supplementary benefits), US$ Reference year: 2017	IMD World Competitiveness Yearbook 2018 [Passport GMID; "Source: © Euromonitor International 2018"; national sources]
Labor productivity in industry	Related GDP (PPP) per person employed in industry (in thousands of US$, constant 2011 prices) Reference year: 2017	Calculated by CNI, based on data from World Bank and International Labour Organization (ILO). *Brazil: CNI estimate, based on data from World Bank and IBGE (System of Quarterly National Accounts, System of National Accounts – reference 2010 and Continuous PNAD).
Labor availability		
Labor force participation rate	Labor force as a percentage of the total population over 15 years old Reference year: 2017	ILOSTAT – International Labour Organization (ILO) [ILO modelled estimates, July 2017]
Labor force growth	Percentage change Reference year: 2017	IMD World Competitiveness Yearbook 2018 [OECD (2018), "Main Economic Indicators - complete database; national sources]
Availability and cost of capital		
Capital cost		
Interest rate spread	Lending rate minus deposit rate Reference year: 2017	IMD World Competitiveness Yearbook 2018. [International Financial Statistics Online April 2018 (IMF); national sources]
Real short-term interest rate	Real discount or bank rate Reference year: 2017	IMD World Competitiveness Yearbook 2018 [International Financial Statistics Online April 2018 (IMF); national sources]
Capital availability		
Domestic credit to private sector	Financial resources provided to the private sector by financial corporations as a percentage of GDP Reference year: 2014-2016, moving average	The Global Competitiveness Report 2018, World Economic Forum [The World Bank Group]
Stock market size	Market value for listed domestic companies as a percentage of GDP. Reference year: 2017	World Bank [World Federation of Exchanges database]
Venture capital availability	Variable generated from answers to the question: In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding? [1 = extremely difficult; 7 = extremely easy] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Financial system performance		
Banking sector assets	Percentage of GDP Reference year: 2017	IMD World Competitiveness Yearbook 2017 [IMF Monetary and Financial Stats (MFS) April 2017]
Country credit rating	Rating on a scale of 0-100 assessed by the Institutional Investor Magazine Reference year: 2016	IMD World Competitiveness Yearbook 2018 [Institutional Investor, September 2016]
NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]

Infrastructure and logistics		
Transport infrastructure		
Quality of roads	Variable generated from answers to the question: In your country, how is the quality (extensiveness and condition) of road infrastructure [1 = extremely poor—among the worst in the world; 7 = extremely good—among the best in the world] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Road connectivity index	Average speed and straightness of a driving itinerary connecting the 10 or more largest cities that together account for at least 15 percent of the economy's total population. Reference year: 2016	The Global Competitiveness Report 2018, World Economic Forum [World Economic Forum's calculations]
Efficiency of train services	Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are train transport services? [1 = extremely inefficient—among the worst in the world; 7 = extremely efficient—among the best in the world] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Railroad density	Kilometers of railroad per 100 square kilometers of land Reference year: 2016	The Global Competitiveness Report 2018, World Economic Forum [The World Bank Group]
Efficiency of seaport services	Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are seaport services (ferries, boats) (for landlocked countries: assess access to seaport services) [1 = extremely inefficient—among the worst in the world; 7 = extremely efficient—among the best in the world] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Liner shipping connectivity	Index generated from the average of five components: (a) the number of ships; (b) the total container-carrying capacity of those ships; (c) the maximum vessel size; (d) the number of services; and (e) the number of companies that deploy container ships on services from and to a country's ports. The base year is 2004 and the base value is the maximum value in 2004. Reference year: 2018	United Nations Conference on Trade and Development, Statistics [UNCTAD, Division on Technology and Logistics, based on Containerization International Online (www.ci-online.co.uk) until 2015 and MDS Transmodal (http://mdst.co.uk) from 2016 onwards]
Efficiency of air transport services	Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are air transport services? [1 = extremely inefficient—among the worst in the world; 7 = extremely efficient—among the best in the world] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Air transport, freight	Volume of freight measured in metric tons times kilometers traveled. Reference year: 2017	World Bank [International Civil Aviation Organization, Civil Aviation Statistics of the World and ICAO staff estimates]
NAME	**DESCRIPTION**	**SOURCE [ORIGINAL SOURCE]**

Energy infrastructure		
Electricity costs for industrial clients	US$ per kWh Reference year: 2017	IMD World Competitiveness Yearbook 2018 [OECD Energy Prices and Taxes 1/2018 (International Energy Agency); national sources] *Brazil: CNI estimate based on data provided by Brazilian Electricity Regulatory Agency (ANEEL) and by the Central Bank of Brazil.
Availability of electricity	Ratio between electricity output and GPD PPP (in 2010 constant prices), expressed in TWh/US$ trillion. Reference year: 2015	Calculated by CNI, based on data from CO2 Emissions from Fuel Combustion Highlights (2017 Edition) and Electricity Information (2018 edition), IEA, Paris.
Quality of electricity supply	Electric power transmission and distribution losses as a percentage of output. Reference year: 2015	The Global Competitiveness Report 2018, World Economic Forum [International Energy Agency (IEA)]
Telecommunications infrastructure		
ICT use	Aggregation of the weighted values (33% each) of three indicators: (1) percentage of individuals using the Internet; (2) fixed (wired)-broadband Internet subscriptions per 100 inhabitants; (3) active mobile-broadband subscriptions per 100 inhabitants. Reference year: 2017	International Telecommunication Union (ITU) Measuring the Information Society Report 2017 [Data for all these indicators are collected by ITU]
ICT access	Aggregation of the weighted values (20% each) of five indicators: (1) fixed telephone subscriptions per 100 inhabitants; (2) mobile cellular telephone subscriptions per 100 inhabitants; (3) international Internet bandwidth (bit/s) per Internet user; (4) percentage of households with a computer; and (5) percentage of households with Internet access. Reference year: 2017	International Telecommunication Union (ITU) Measuring the Information Society Report 2017 [Data for all these indicators are collected by ITU]
International logistics		
Logistic Performance Index (LPI)	Aggregation of the values (1-5 scale) of six components: (1) the efficiency of customs and border management; (2) the quality of trade and transport infrastructure; (3) the ease of arranging competitively priced shipments; (4) the competence and quality of logistics services; (5) the ability to track and trace consignments; (6) the frequency with which shipments reach consignees within scheduled or expected delivery times. Reference year: 2018	Connecting to Compete 2018. Trade Logistics in the Global Economy, World Bank, 2018
Time and cost to export and import	Distance to frontier (0-100 scale). Simple average of scores of the following indicators: (1) time and cost for documentary compliance when exporting; (2) time and cost for border compliance when exporting; (3) time and cost for documentary compliance when importing; (4) time and cost for border compliance when importing. Reference year: 2018	World Bank, Doing Business 2019

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Taxation		
Taxes		
Collected total tax revenues	Percentage of GDP Reference year: 2016	IMD World Competitiveness Yearbook 2018 [OECD Revenue Statistics 2018; Government Finance Statistics 2018; national sources]
Total tax rate (% of profit)	Total taxes paid by a company as a percentage of its profits (the profit or corporate income tax, social contributions and labor taxes paid by the employer, property taxes, property transfer taxes, dividend tax, capital gains tax, financial transactions tax, waste collection taxes, vehicle and road taxes, and any other small taxes or fees). Reference year: 2018	World Bank, Doing Business 2019
Corporate tax rates	Average corporate tax rates Reference year: 2018	Tax Rates Online, KPMG
Indirect tax rates	Average indirect tax rates Reference year: 2018	Tax Rates Online, KPMG
Macroeconomic environment		
Macroeconomic indicators		
Inflation	Annual percent change in consumer price index Reference year: 2017	World Economic Outlook Database, Oct. 2018, IMF
General government debt	Percentage of GDP Reference year: 2017	World Economic Outlook Database, Oct. 2018, IMF
General government net debt interest payments	Interest payments on government debt, obtained by the difference between General government net lending/borrowing and General government primary net lending/borrowing. Percentage of GDP. Reference year: 2017	Calculated by CNI, based on data from World Economic Outlook Database, Oct. 2018, IMF.
Gross fixed capital formation	Percentage of GDP Reference year: 2017	IMD World Competitiveness Yearbook 2018 [national sources]
Direct investment flows inward	Percentage of GDP Reference year: 2017	IMD World Competitiveness Yearbook 2018 [UNCTADSTAT 2018 (http://unctadstat.unctad.org); International Financial Statistics Online April 2018 (IMF); national sources]
Real effective exchange rate	Real effective exchange rate (monthly average) on the reference date, expressed as a percentage of the arithmetic average of the monthly rates observed from January 2013 to December 2017. Reference year: December 2017	Calculated by CNI, based on the real effective exchange rate estimated by the Bank for International Settlements.
Productive structure, scale and competition		
Productive structure		
Economic Complexity Index (ECI)	The economic complexity index is based on the diversity of exports a country produces and their ubiquity, or the number of the countries able to produce them. Countries that can sustain a diverse range of productive know-how, including sophisticated, unique know-how, show high values for ECI. These countries can produce a wide diversity of goods, including complex products that few other countries can make. Reference year: 2016	The Atlas of Economic Complexity, Center of International Development at Harvard University

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Scale		
Domestic market size	Sum of GDP (PPP) plus value of imports (PPP) of goods and services, minus value of exports (PPP) of goods and services (in billions of U.S. dollars). Reference year: 2017	Calculated by CNI, based on data from World Bank.
Competition		
Trade tariffs	The weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. Reference year: 2017	The Global Competitiveness Report 2018, World Economic Forum [International Trade Centre (ITC)]
Extent of market dominance	Variable generated from answers to the question: In your country, how do you characterize corporate activity? [1 = dominated by a few business groups; 7 = spread among many firms] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Business environment		
Government Efficiency		
Control of corruption	Index generated based on perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Reference year: 2017	The Worldwide Governance Indicators, 2018 Update [Daniel Kaufmann, Natural Resource Governance Institute (NRGI) and Brookings Institution; Aart Kraay, World Bank Development Research Group]
Regulatory quality	Index generated based on perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Reference year: 2017	The Worldwide Governance Indicators, 2018 Update [Daniel Kaufmann, Natural Resource Governance Institute (NRGI) and Brookings Institution; Aart Kraay, World Bank Development Research Group]
Publicized laws and government data	Index generated based on perceptions about access to information and text of laws publicized by the government, as well as based on the Open Data Index. Reference year: 2017-2018	Rule of Law Index ® 2017-2018, World Justice Project
Legal certainty		
Rule of Law	Index generated based on perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Reference year: 2017	The Worldwide Governance Indicators, 2018 Update [Daniel Kaufmann, Natural Resource Governance Institute (NRGI) and Brookings Institution; Aart Kraay, World Bank Development Research Group]
Efficiency of legal framework in challenging regulations	Variable generated from answers to the question: In your country, how easy is it for private businesses to challenge government actions and/or regulations through the legal system? [1 = extremely difficult; 7 = extremely easy] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Enforcing contracts	Distance to frontier (0-100 scale). Simple average of the scores in three indicators: time and cost for resolving a commercial dispute through local courts; the quality of judicial processes index (adoption of good practices that promote quality and efficiency in the court system). Reference year: 2018	World Bank, Doing Business 2019
Red tape		
Starting a business	Distance to frontier (0-100 scale). Simple average of scores in four indicators: (1) procedures to legally start and formally operate a company (number); (2) time required to complete each procedure (calendar days); (3) cost required to complete each procedure (percentage of per capita income); (4) paid-in minimum capital (percentage of per capita income). Reference year: 2018	World Bank, Doing Business 2019
Hiring and firing practices	Variable generated from answers to the question: In your country, to what extent do regulations allow flexible hiring and firing of workers? [1 = not at all; 7 = to a great extent] Reference year: 2017-2018, weighted average	The Global Competitiveness Report 2018, World Economic Forum [Executive Opinion Survey]
Education		
Educational attainment		
Gross enrollment ratio in secondary education	Number of students enrolled in secondary level, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. Reference year: 2016	UNESCO Institute for Statistics. Education: September 2018
Gross enrollment ratio in tertiary education	Number of students enrolled in tertiary level, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. Reference year: 2016	UNESCO Institute for Statistics. Education: September 2018
Percentage of adults who have attained at least upper secondary education	Percentage of adults aged between 25 and 64 who have attained at least upper secondary education. *Brazil: Percentage of adults aged 25 years and above who have attained at least upper secondary education. Reference year: 2017	OECD: Education at a Glance 2018 *Brazil: CNI estimate, based on data from IBGE (Continuous PNAD).
Percentage of adults who have attained tertiary education	Percentage of adults aged between 25 and 64 who have attained tertiary education. *Brazil: Percentage of adults aged 25 years or above who have attained tertiary education. Reference year: 2017	OECD: Education at a Glance 2018. *Brazil: IBGE (Continuous PNAD).
Educational assessment		
Performance in mathematics	Average scores in math tests, 15-year-old students. Reference year: 2015	PISA 2015 Results (Volume I): Excellence and Equity in Education - OECD 2016
Performance in reading	Average scores in reading tests, 15-year-old students. Reference year: 2015	PISA 2015 Results (Volume I): Excellence and Equity in Education - OECD 2016

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Performance in science	Average scores in science tests, 15-year-old students. Reference year: 2015	PISA 2015 Results (Volume I): Excellence and Equity in Education - OECD 2016
Expenditure on education		
Total public expenditure on education	Percentage of GDP Reference year: 2016	IMD World Competitiveness Yearbook 2018. [UNESCO (http://stats.uis.unesco.org); Eurostat April 2018; national sources].
Total public expenditure on education per capita	US$ per capita Reference year: 2016	IMD World Competitiveness Yearbook 2018 [UNESCO (http://stats.uis.unesco.org); Eurostat April 2018; national sources].
Technology and innovation		
R&D efforts		
Gross expenditure on R&D (% of GDP)	Total expenditure on research and development (R&D) as a percentage of GDP Reference year: 2016	UNESCO Institute for Statistics. Science, technology and innovation: June 2018
Gross expenditure on R&D financed by business enterprise (% of total R&D expenditure)	Gross expenditure on research and development (R&D) financed by business enterprise as a percentage of total expenditure on R&D Reference year: 2015	UNESCO Institute for Statistics. Science, technology and innovation: June 2018
Outcomes of R&D efforts		
PCT international applications	Number of international patent applications filed by residents at the Patent Cooperation Treaty (PCT) (per billion PPP$ GDP). Reference year: 2017	Global Innovation Index 2018
Scientific and technical publications	Number of scientific and technical journal articles (per billion PPP$ GDP). Articles counts are from a set of journals covered by the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI). Reference year: 2017	Global Innovation Index 2018
High-tech exports	High-technology exports minus re-exports (% of total trade) Reference year: 2016	Global Innovation Index 2018

7. RANKINGS FOR THE SUBFACTORS AND VARIABLES

1 Labor cost sub-factor

Turkey	6.16
Indonesia	5.77
Russia	5.69
Mexico	5.67
Thailand	5.66
Chile	5.65
Peru	5.60
Colombia	5.60
South Africa	5.57
China	5.45
Poland	5.33
Argentina	5.21
Brazil	5.19
Canada	5.19
India	5.18
South Korea	4.91
Spain	4.83
Australia	4.28
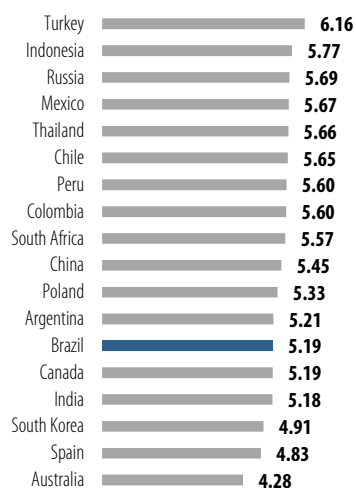
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

1.1 Compensation levels in manufacturing (2017)

Indonesia	0.88
Colombia	1.97
India	2.08
Thailand	2.14
Peru	2.15
Mexico	2.27
Turkey	3.48
South Africa	3.52
China	3.62
Russia	3.88
Brazil	4.23
Chile	5.65
Argentina	5.99
Poland	6.48
Spain	18.26
South Korea	18.76
Canada	19.65
Australia	26.06
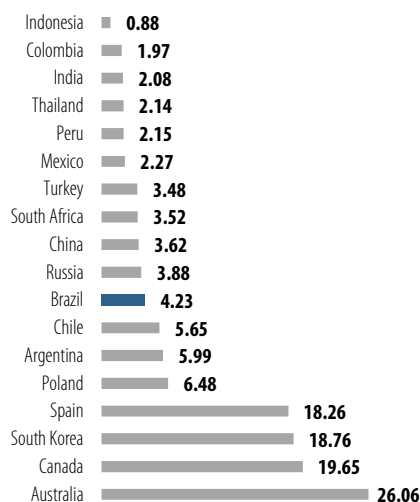
Total hourly compensation in manufacturing (wages plus supplementary benefits), US$
Source: IMD World Competitiveness Yearbook 2018
Note: India (2015)

1.2 Labor productivity in industry (2017)

Canada	120.8
Australia	109.2
South Korea	100.6
Spain	93.5
Turkey	79.7
Chile	64.7
Russia	56.9
Poland	52.6
South Africa	48.2
Mexico	46.4
Thailand	45.1
Indonesia	44.0
Argentina	42.9
China	42.3
Peru	42.0
Colombia	40.8
Brazil*	32.1
India	18.9
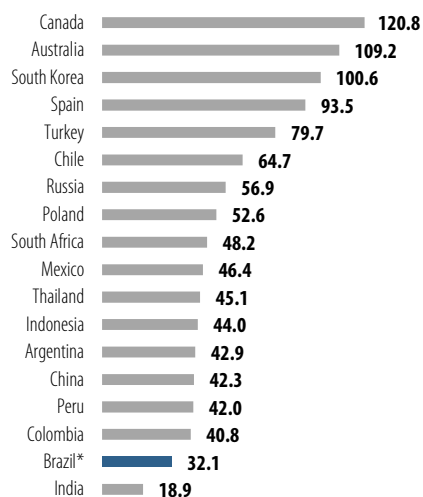
Related GDP (PPP) per person employed in industry (in thousands of US$, constant 2011 prices)
Source: Calculated by CNI, based on data from World Bank and International Labour Organization (ILO)
*CNI estimate, based on data from World Bank and IBGE (System of Quarterly National Accounts, System of National Accounts - reference 2010 and Continuous PNAD).

2 Labor availability sub-factor

Peru	5.57
Australia	4.96
Chile	4.65
Indonesia	4.62
Brazil	4.33
Colombia	4.24
Canada	4.11
Turkey	3.95
South Korea	3.90
China	3.88
Mexico	3.80
Thailand	3.74
Argentina	3.57
South Africa	3.39
India	3.37
Russia	3.28
Spain	2.80
Poland	2.63
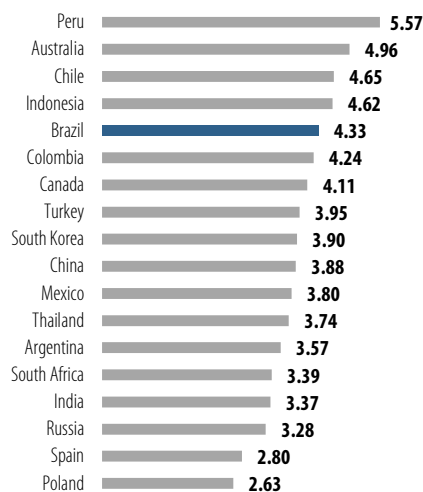
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

2.1 Labor force participation rate (2017)

Peru	**76.7**
Colombia	**70.4**
China	**68.9**
Thailand	**68.6**
Indonesia	**66.3**
Canada	**65.2**
Australia	**64.8**
Brazil	**63.7**
Russia	**63.5**
South Korea	**62.6**
Chile	**62.3**
Mexico	**61.3**
Argentina	**59.9**
Spain	**57.8**
Poland	**56.6**
South Africa	**54.7**
India	**53.8**
Turkey	**51.6**
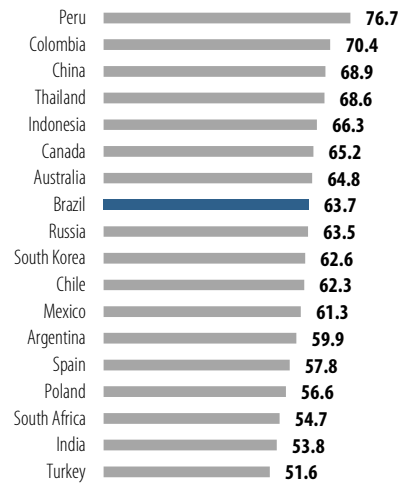
Labor force as a percentage of the total population over 15 years old
Source: International Labour Organization (ILO)

2.2 Labor force growth (2017)

Turkey	**3.63**
Australia	**3.20**
Chile	**2.99**
Peru	**2.11**
Indonesia	**2.09**
Brazil	**1.97**
India	**1.82**
South Africa	**1.68**
Mexico	**1.23**
South Korea	**1.20**
Canada	**1.14**
Argentina	**1.00**
Colombia	**0.34**
China	**-0.17**
Spain	**-0.36**
Thailand	**-0.44**
Russia	**-0.44**
Poland	**-0.51**
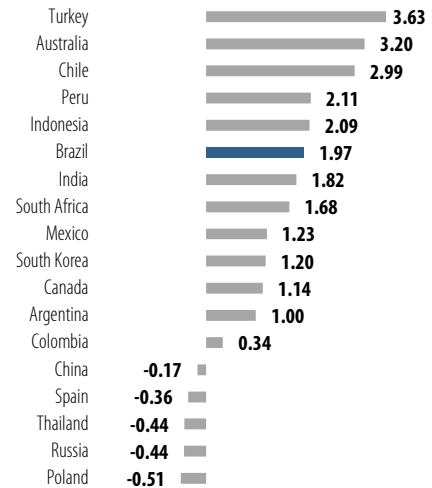
Percentage change
Source: IMD World Competitiveness Yearbook 2018

3 Capital cost sub-factor

Spain	**9.55**
Turkey	**9.30**
South Korea	**9.23**
Mexico	**8.97**
Canada	**8.86**
Australia	**8.66**
Poland	**8.62**
Chile	**8.47**
Indonesia	**8.13**
China	**7.99**
Thailand	**7.96**
South Africa	**7.88**
India	**7.69**
Colombia	**6.95**
Peru	**6.65**
Argentina	**6.55**
Russia	**6.11**
Brazil	**0.00**
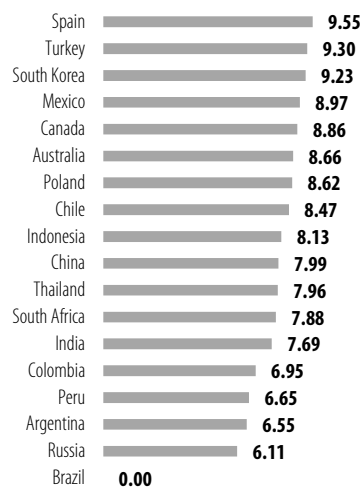
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

3.1 Interest rate spread (2017)

Chile	**1.61**
South Korea	**1.81**
Spain	**1.91**
India	**2.60**
China	**2.85**
Canada	**3.10**
Thailand	**3.10**
South Africa	**3.13**
Australia	**3.23**
Poland	**3.30**
Turkey	**3.53**
Indonesia	**4.55**
Mexico	**4.65**
Russia	**5.21**
Colombia	**7.70**
Argentina	**9.69**
Peru	**14.20**
Brazil	**38.40**
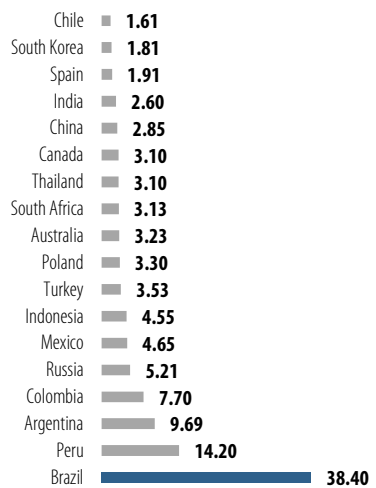
Lending rate minus deposit rate
Source: IMD World Competitiveness Yearbook 2018

3.2 Real short-term interest rate (2017)

Spain	-2.25
Turkey	-2.15
Mexico	-1.69
South Korea	-1.42
Canada	-0.91
Australia	-0.46
Poland	-0.39
Indonesia	0.42
Chile	0.54
Peru	0.97
China	1.32
Thailand	1.33
South Africa	1.52
India	2.15
Colombia	2.34
Argentina	2.68
Russia	5.23
Brazil	9.64
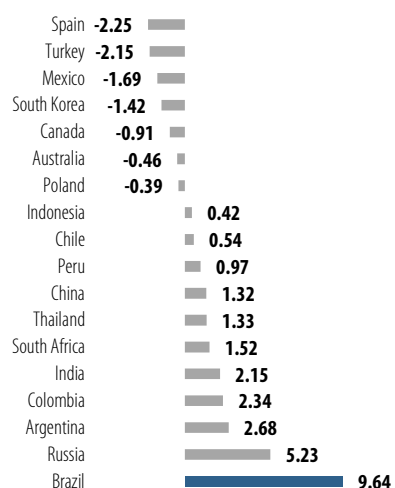
Real discount or bank rate
Source: IMD World Competitiveness Yearbook 2018

4 Capital availability sub-factor

South Africa	6.60
Canada	5.71
China	5.03
Thailand	4.82
Australia	4.57
South Korea	4.34
Chile	4.09
Spain	3.85
India	3.74
Indonesia	2.79
Colombia	2.08
Turkey	2.08
Peru	2.04
Brazil	2.04
Mexico	2.03
Poland	2.02
Russia	1.99
Argentina	1.02

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

4.1 Domestic credit to private sector (2014-2016, moving average)
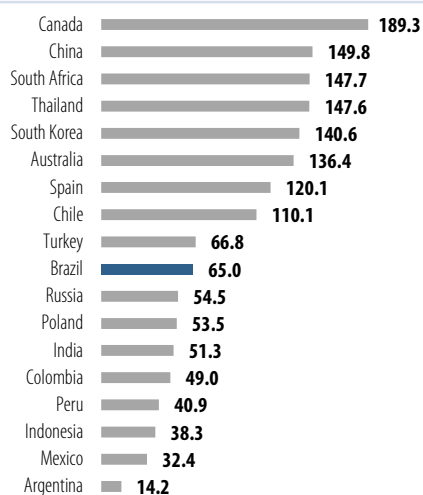
Canada	189.3
China	149.8
South Africa	147.7
Thailand	147.6
South Korea	140.6
Australia	136.4
Spain	120.1
Chile	110.1
Turkey	66.8
Brazil	65.0
Russia	54.5
Poland	53.5
India	51.3
Colombia	49.0
Peru	40.9
Indonesia	38.3
Mexico	32.4
Argentina	14.2

Financial resources provided to the private sector by financial corporations as a percentage of GDP
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: Canada and Peru (2015-2017, average).

4.2 Stock market size (2017)

South Africa	352.3
Canada	143.2
Thailand	120.6
South Korea	115.7
Australia	114.0
Chile	106.4
India	89.8
China	71.2
Spain	67.8
Indonesia	51.3
Peru	46.9
Brazil	46.4
Russia	39.5
Colombia	39.3
Poland	38.4
Mexico	36.3
Turkey	26.7
Argentina	17.1
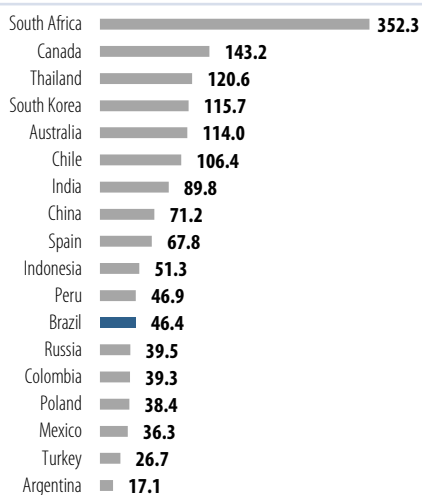
Market value for listed domestic companies as a percentage of GDP.
Source: World Bank

4.3 Venture capital availability (2017-2018, weighted average)
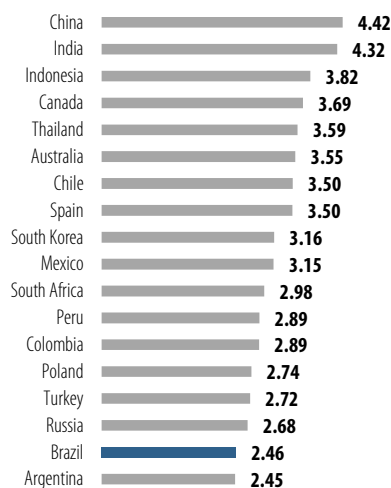
China	4.42
India	4.32
Indonesia	3.82
Canada	3.69
Thailand	3.59
Australia	3.55
Chile	3.50
Spain	3.50
South Korea	3.16
Mexico	3.15
South Africa	2.98
Peru	2.89
Colombia	2.89
Poland	2.74
Turkey	2.72
Russia	2.68
Brazil	2.46
Argentina	2.45

Variable generated from answers to the question: In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding? [1 = extremely difficult; 7 = extremely easy]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

5 Financial system performance sub-factor

Australia	5.36
South Korea	5.06
China	5.03
Chile	4.11
Spain	3.94
Poland	3.83
Thailand	3.54
Mexico	3.45
Peru	3.18
Colombia	3.15
India	3.05
Brazil	2.89
Russia	2.58
South Africa	2.58
Indonesia	2.51
Turkey	2.36
Argentina	0.54
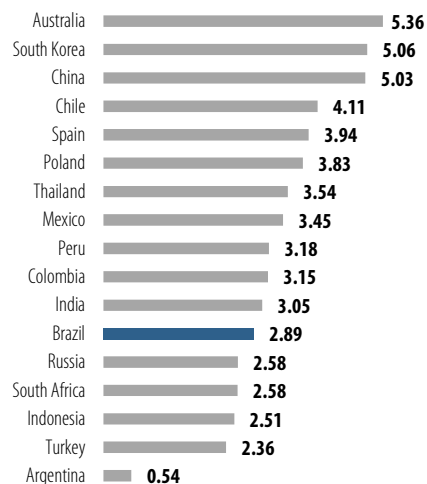
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

5.1 Banking sector assets (2017)

China	245.8
South Korea	193.1
Spain	165.5
Thailand	164.5
Australia	155.6
Brazil	126.1
South Africa	93.7
Chile	92.7
Russia	92.4
India	90.6
Poland	84.7
Turkey	74.2
Colombia	69.0
Peru	55.4
Mexico	55.3
Indonesia	53.5
Argentina	47.8

Percentage of GDP.
Source: IMD World Competitiveness Yearbook 2018
Note: Peru and Russia (2015); Colombia and India (2016).

5.2 Country credit rating (2016)

Canada	92.3
Australia	90.0
South Korea	81.7
Chile	77.3
China	76.0
Poland	73.8
Mexico	71.0
Spain	67.5
Peru	66.9
Colombia	65.2
Thailand	61.5
India	61.4
Indonesia	57.0
Brazil	55.5
Russia	54.2
South Africa	54.0
Turkey	52.6
Argentina	27.7
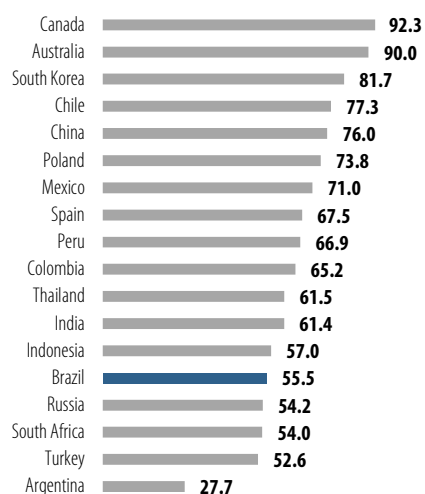
Rating on a scale of 0-100 assessed by the Institutional Investor Magazine
Source: IMD World Competitiveness Yearbook 2018

6 Transport infrastructure sub-factor

South Korea	7.47
Spain	7.07
China	6.71
Australia	6.42
Canada	6.11
Poland	5.68
Turkey	5.64
Chile	5.51
India	5.46
South Africa	5.42
Russia	5.25
Mexico	5.22
Thailand	4.88
Indonesia	4.60
Argentina	4.41
Colombia	4.29
Brazil	3.85
Peru	3.67
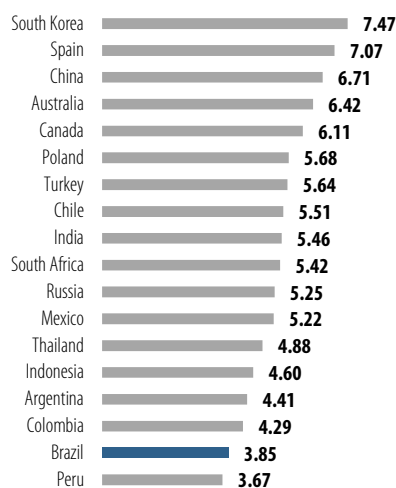
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

6.1 Quality of roads (2017-2018, weighted average)
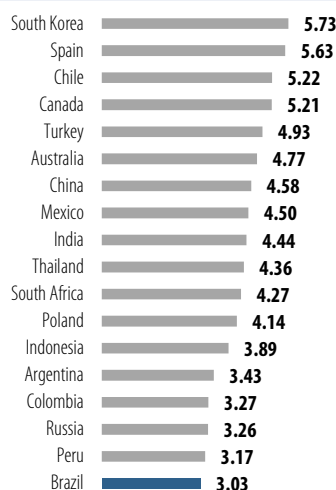
South Korea	5.73
Spain	5.63
Chile	5.22
Canada	5.21
Turkey	4.93
Australia	4.77
China	4.58
Mexico	4.50
India	4.44
Thailand	4.36
South Africa	4.27
Poland	4.14
Indonesia	3.89
Argentina	3.43
Colombia	3.27
Russia	3.26
Peru	3.17
Brazil	3.03

Variable generated from answers to the question: In your country, how is the quality (extensiveness and condition) of road infrastructure [1 = extremely poor-among the worst in the world; 7 = extremely good-among the best in the world]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

6.2 Road connectivity index (2016)
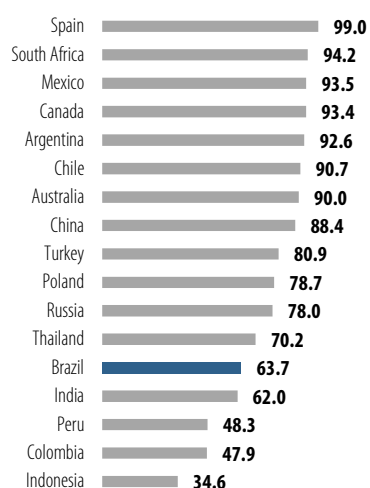
Spain	99.0
South Africa	94.2
Mexico	93.5
Canada	93.4
Argentina	92.6
Chile	90.7
Australia	90.0
China	88.4
Turkey	80.9
Poland	78.7
Russia	78.0
Thailand	70.2
Brazil	63.7
India	62.0
Peru	48.3
Colombia	47.9
Indonesia	34.6

Average speed and straightness of a driving itinerary connecting the 10 or more largest cities that together account for at least 15 percent of the economy's total population.
Source: The Global Competitiveness Report 2018, World Economic Forum

6.3 Efficiency of train services (2017-2018, weighted average)
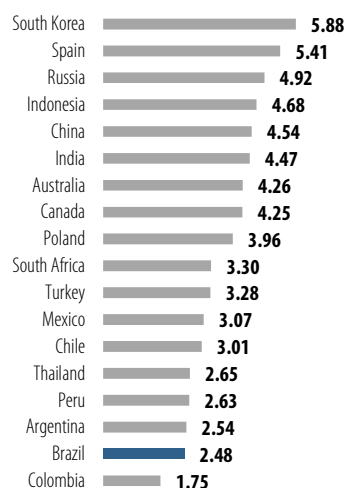
South Korea	5.88
Spain	5.41
Russia	4.92
Indonesia	4.68
China	4.54
India	4.47
Australia	4.26
Canada	4.25
Poland	3.96
South Africa	3.30
Turkey	3.28
Mexico	3.07
Chile	3.01
Thailand	2.65
Peru	2.63
Argentina	2.54
Brazil	2.48
Colombia	1.75

Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are train transport services? [1 = extremely inefficient-among the worst in the world; 7 = extremely efficient-among the best in the world]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

6.4 Railroad density (2016)

Poland	**58.9**
South Korea	**40.6**
Spain	**30.9**
India	**20.1**
South Africa	**16.8**
Mexico	**13.6**
Turkey	**12.9**
Thailand	**10.4**
Argentina	**10.3**
Chile	**7.3**
China	**7.0**
Canada	**5.2**
Russia	**5.0**
Brazil	**3.5**
Indonesia	**2.5**
Peru	**1.6**
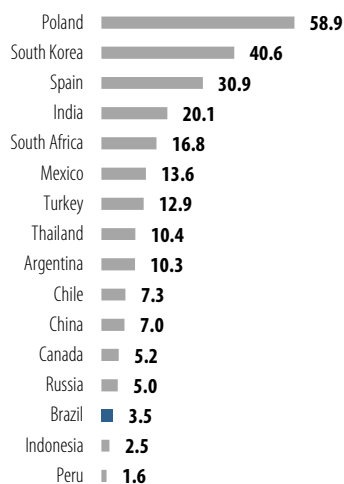
Kilometers of railroad per 100 km² of land
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: South Africa, Brazil, Canada, Chile, Indonesia, Mexico, Peru and Thailand (2014); India (2015).

6.5 Efficiency of seaport services (2017-2018, weighted average)
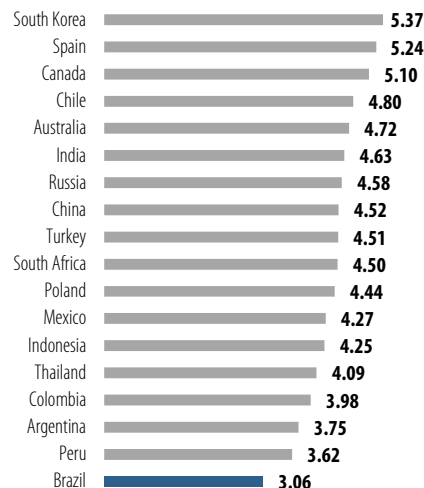
South Korea	**5.37**
Spain	**5.24**
Canada	**5.10**
Chile	**4.80**
Australia	**4.72**
India	**4.63**
Russia	**4.58**
China	**4.52**
Turkey	**4.51**
South Africa	**4.50**
Poland	**4.44**
Mexico	**4.27**
Indonesia	**4.25**
Thailand	**4.09**
Colombia	**3.98**
Argentina	**3.75**
Peru	**3.62**
Brazil	**3.06**

Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are seaport services (ferries, boats) (for landlocked countries: assess access to seaport services) [1 = extremely inefficient-among the worst in the world; 7 = extremely efficient-among the best in the world]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

6.6 Liner shipping connectivity (2018)
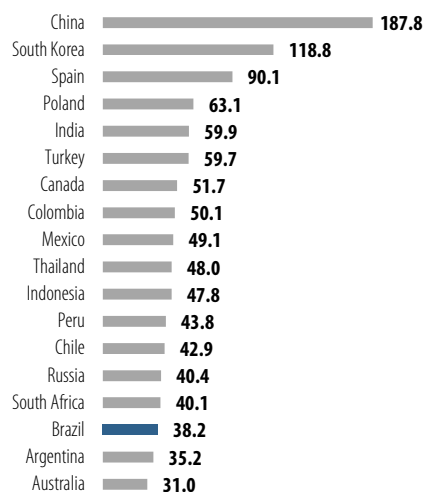
China	**187.8**
South Korea	**118.8**
Spain	**90.1**
Poland	**63.1**
India	**59.9**
Turkey	**59.7**
Canada	**51.7**
Colombia	**50.1**
Mexico	**49.1**
Thailand	**48.0**
Indonesia	**47.8**
Peru	**43.8**
Chile	**42.9**
Russia	**40.4**
South Africa	**40.1**
Brazil	**38.2**
Argentina	**35.2**
Australia	**31.0**

Index generated from the average of five components: (a) the number of ships; (b) the total container-carrying capacity of those ships; (c) the maximum vessel size; (d) the number of services; and (e) the number of companies that deploy container ships on services from and to a country's ports. The base year is 2004 and the base value is the maximum value in 2004.
Source: UNCTAD, Division on Technology and Logistics

6.7 Efficiency of air transport services (2017-2018, weighted average)
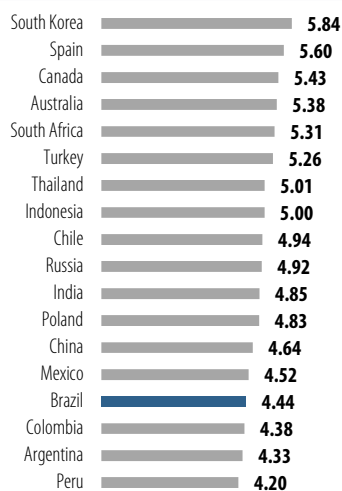
South Korea	**5.84**
Spain	**5.60**
Canada	**5.43**
Australia	**5.38**
South Africa	**5.31**
Turkey	**5.26**
Thailand	**5.01**
Indonesia	**5.00**
Chile	**4.94**
Russia	**4.92**
India	**4.85**
Poland	**4.83**
China	**4.64**
Mexico	**4.52**
Brazil	**4.44**
Colombia	**4.38**
Argentina	**4.33**
Peru	**4.20**

Variable generated from answers to the question: In your country, how efficient (i.e., frequency, punctuality, speed, price) are air transport services? [1 = extremely inefficient-among the worst in the world; 7 = extremely efficient-among the best in the world]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

6.8 Air transport, freight (2017)

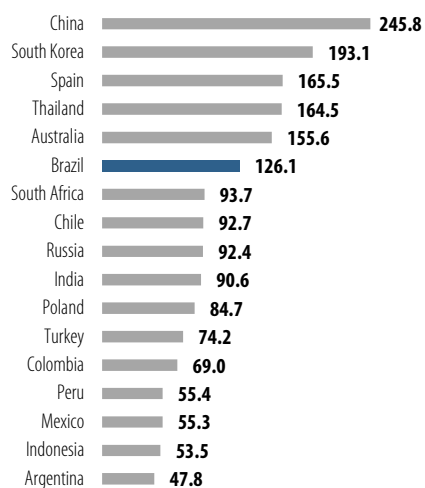|	
China	23.3
South Korea	11.0
Russia	6.8
Turkey	4.8
Canada	2.8
India	2.4
Thailand	2.4
Australia	2.0
Brazil	1.7
Chile	1.2
Colombia	1.1
Spain	1.1
Indonesia	1.1
Mexico	0.9
South Africa	0.8
Peru	0.3
Argentina	0.3
Poland	0.2
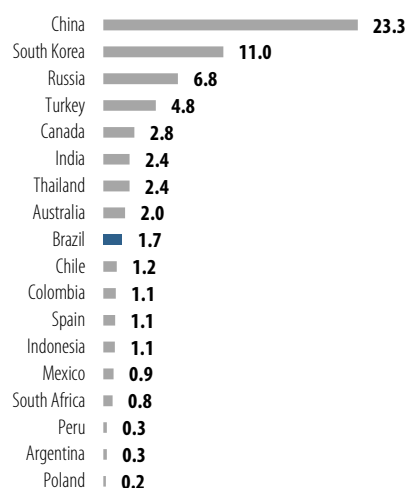
Volume of freight measured in metric tons times kilometers traveled - Thousands of Tons-Kilometers
Source: World Bank

7 Telecommunications infrastructure sub-factor

South Korea	9.45
Australia	8.51
Spain	8.08
Canada	8.08
Russia	7.01
Poland	6.85
Argentina	6.69
Chile	6.32
Brazil	6.16
Turkey	5.76
China	5.51
Thailand	5.48
Colombia	5.04
Mexico	4.98
South Africa	4.69
Peru	4.36
Indonesia	3.90
India	2.25
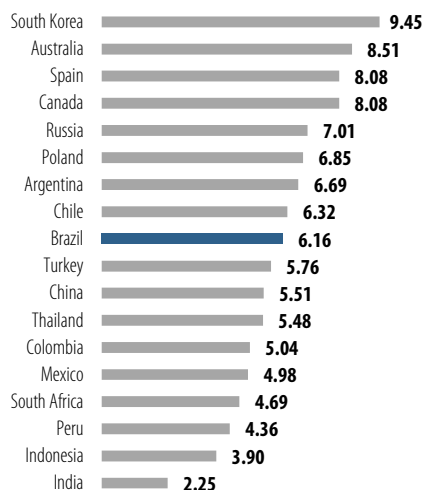
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

7.1 ICT use (2017)
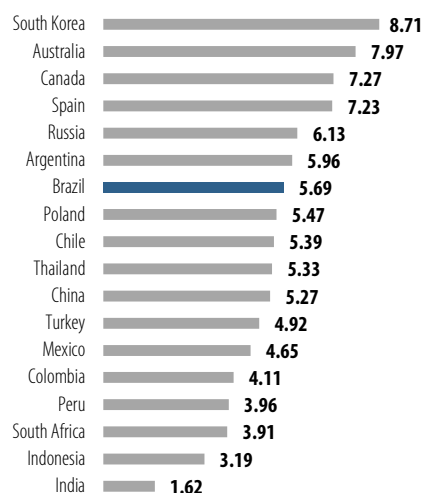
South Korea	8.71
Australia	7.97
Canada	7.27
Spain	7.23
Russia	6.13
Argentina	5.96
Brazil	5.69
Poland	5.47
Chile	5.39
Thailand	5.33
China	5.27
Turkey	4.92
Mexico	4.65
Colombia	4.11
Peru	3.96
South Africa	3.91
Indonesia	3.19
India	1.62

Aggregation of the weighted values (33% each) of three indicators: (1) percentage of individuals using the Internet; (2) fixed (wired)-broadband Internet subscriptions per 100 inhabitants; (3) active mobile- broadband subscriptions per 100 inhabitants.
Source: International Telecommunication Union (ITU)

7.2 ICT access (2017)
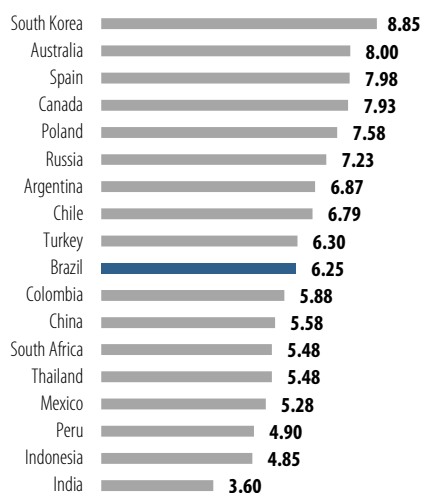
South Korea	8.85
Australia	8.00
Spain	7.98
Canada	7.93
Poland	7.58
Russia	7.23
Argentina	6.87
Chile	6.79
Turkey	6.30
Brazil	6.25
Colombia	5.88
China	5.58
South Africa	5.48
Thailand	5.48
Mexico	5.28
Peru	4.90
Indonesia	4.85
India	3.60

Aggregation of the weighted values (20% each) of five indicators: (1) fixed telephone subscriptions per 100 inhabitants; (2) mobile cellular telephone subscriptions per 100 inhabitants; (3) international Internet bandwidth (bit/s) per Internet user; (4) percentage of households with a computer; and (5) percentage of households with Internet access.
Source: International Telecommunication Union (ITU)

8 Energy infrastructure sub-factor

South Korea	**6.00**
Canada	**6.00**
Argentina	**6.00**
China	**5.88**
South Africa	**5.80**
Poland	**5.63**
Russia	**5.53**
Australia	**5.50**
Peru	**5.36**
Thailand	**5.23**
Mexico	**5.06**
Turkey	**5.03**
Spain	**4.79**
Indonesia	**4.66**
Chile	**4.56**
Colombia	**4.31**
India	**4.19**
Brazil	**3.31**
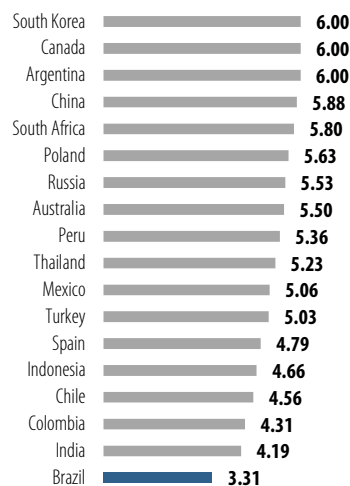
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

8.1 Electricity costs for industrial clients (2017)

Argentina	**0.05**
Peru	**0.08**
Poland	**0.08**
Canada	**0.08**
Turkey	**0.09**
Mexico	**0.09**
South Korea	**0.09**
Russia	**0.10**
Indonesia	**0.11**
Spain	**0.12**
Colombia	**0.12**
Chile	**0.14**
Brazil*	**0.17**
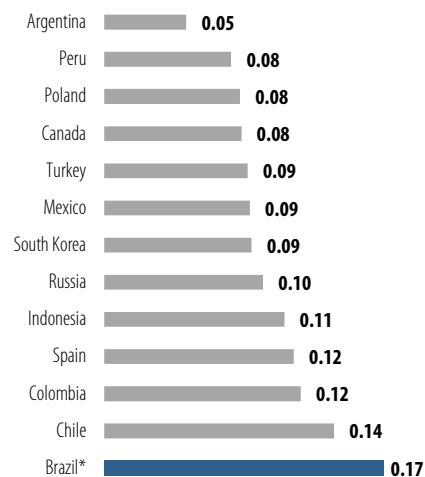
US$ per kWh
Source: IMD World Competitiveness Yearbook 2018
Note: Peru (2015); Spain, Poland and Russia (2016).
*CNI estimate based on data provided by Brazilian Electricity Regulatory Agency (ANEEL) and by the Central Bank of Brazil.

8.2 Availability of electricity (2015)
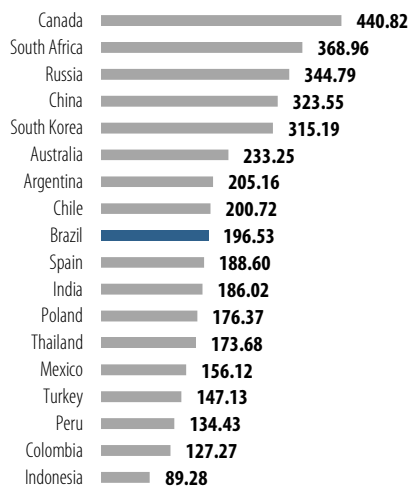
Canada	**440.82**
South Africa	**368.96**
Russia	**344.79**
China	**323.55**
South Korea	**315.19**
Australia	**233.25**
Argentina	**205.16**
Chile	**200.72**
Brazil	**196.53**
Spain	**188.60**
India	**186.02**
Poland	**176.37**
Thailand	**173.68**
Mexico	**156.12**
Turkey	**147.13**
Peru	**134.43**
Colombia	**127.27**
Indonesia	**89.28**

Ratio between electricity output and GPD PPP (in 2010 constant prices), expressed in TWh/US$ trillion.
Source: Calculated by CNI, based on data from IEA

8.3 Quality of electricity supply (2015)

South Korea	**3.3**
Chile	**4.9**
China	**5.1**
Australia	**5.7**
Thailand	**6.2**
Poland	**6.4**
South Africa	**8.0**
Indonesia	**9.4**
Spain	**9.4**
Russia	**10.1**
Canada	**10.9**
Peru	**11.0**
Mexico	**13.1**
Argentina	**13.2**
Colombia	**13.5**
Turkey	**13.7**
Brazil	**15.1**
India	**18.6**
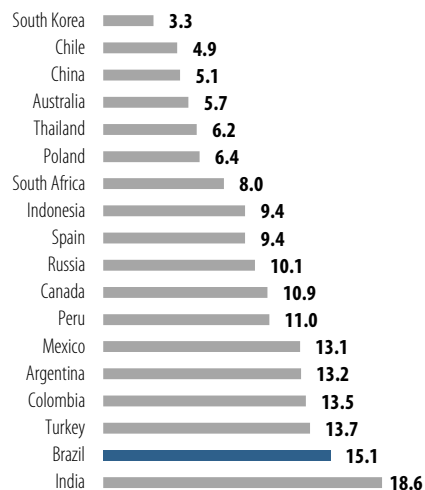
Electric power transmission and distribution losses as a percentage of output.
Source: The Global Competitiveness Report 2018, World Economic Forum

9 International logistics sub-factor

Spain	9.18
Poland	8.53
Canada	8.34
South Korea	8.30
China	7.77
Australia	7.46
Thailand	7.45
Turkey	7.15
Chile	7.03
India	6.56
Mexico	6.52
South Africa	6.08
Indonesia	5.97
Brazil	5.74
Russia	5.30
Argentina	5.29
Colombia	5.23
Peru	5.01
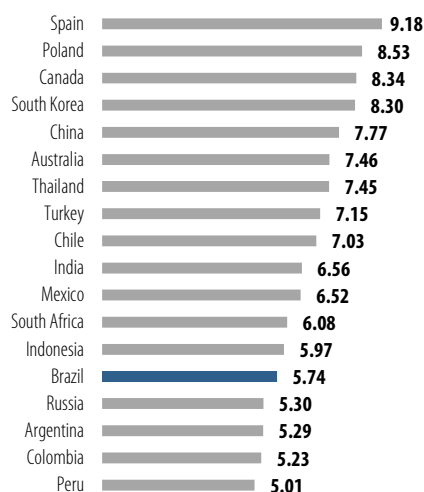
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

9.1 Logistic Performance Index (LPI) (2018)
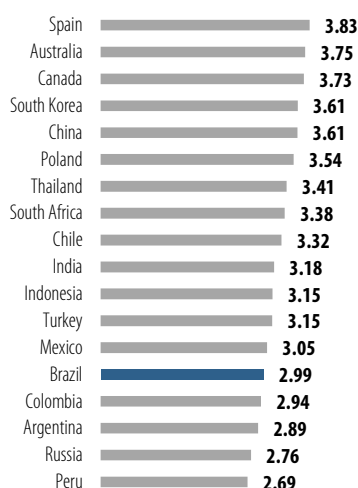
Spain	3.83
Australia	3.75
Canada	3.73
South Korea	3.61
China	3.61
Poland	3.54
Thailand	3.41
South Africa	3.38
Chile	3.32
India	3.18
Indonesia	3.15
Turkey	3.15
Mexico	3.05
Brazil	2.99
Colombia	2.94
Argentina	2.89
Russia	2.76
Peru	2.69

Aggregation of the values (1-5 scale) of six components: (1) the efficiency of customs and border management; (2) the quality of trade and transport infrastructure; (3) the ease of arranging competitively priced shipments; (4) the competence and quality of logistics services; (5) the ability to track and trace consignments; (6) the frequency with which shipments reach consignees within scheduled or expected delivery times.
Source: Connecting to Compete 2018. Trade Logistics in the Global Economy, World Bank, 2018

9.2 Time and cost to export and import (2018)
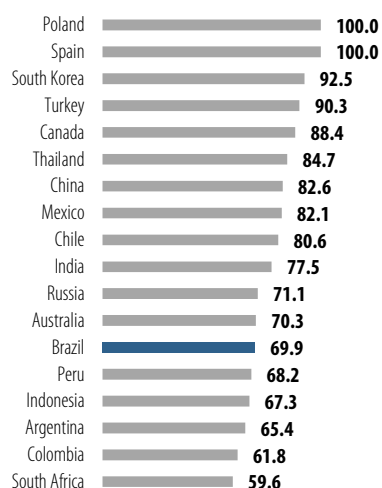
Poland	100.0
Spain	100.0
South Korea	92.5
Turkey	90.3
Canada	88.4
Thailand	84.7
China	82.6
Mexico	82.1
Chile	80.6
India	77.5
Russia	71.1
Australia	70.3
Brazil	69.9
Peru	68.2
Indonesia	67.3
Argentina	65.4
Colombia	61.8
South Africa	59.6

Distance to frontier (0-100 scale). Simple average of scores of the following indicators: (1) time and cost for documentary compliance when exporting; (2) time and cost for border compliance when exporting; (3) time and cost for documentary compliance when importing; (4) time and cost for border compliance when importing.
Source: Doing Business 2019, World Bank

10 Taxes sub-factor

Thailand	7.42
Indonesia	7.14
Canada	6.50
South Korea	6.30
Russia	6.18
Peru	5.93
Mexico	5.87
South Africa	5.84
Australia	5.81
China	5.79
Chile	5.77
Turkey	5.66
India	5.50
Colombia	5.22
Brazil	5.10
Poland	4.85
Spain	4.70
Argentina	4.49
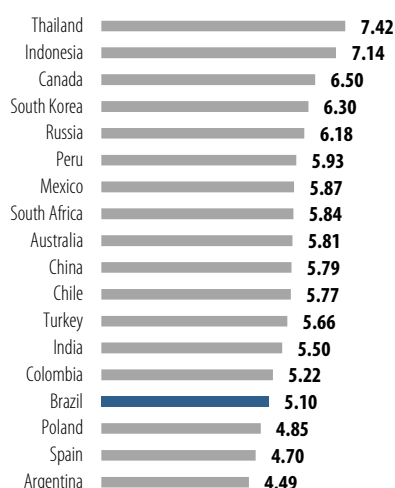
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

10.1 Collected total tax revenues (2016)

Indonesia	**12.5**
India	**15.7**
Peru	**15.7**
Mexico	**16.2**
Colombia	**16.4**
Thailand	**16.4**
Russia	**16.9**
China	**17.5**
Chile	**20.1**
Brazil	**20.6**
Argentina	**21.2**
Turkey	**25.3**
South Africa	**26.2**
South Korea	**26.2**
Australia	**27.8**
Canada	**32.0**
Spain	**33.3**
Poland	**33.5**
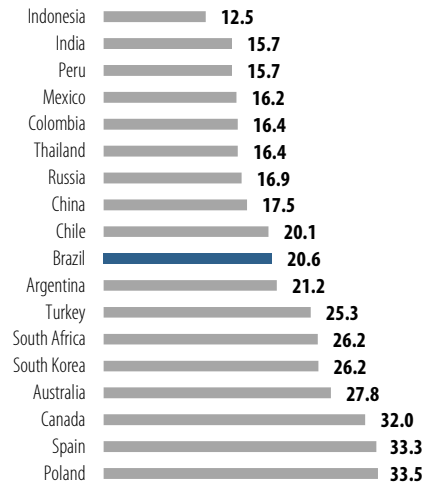
Percentage of GDP.
Source: IMD World Competitiveness Yearbook 2018

10.2 Corporate tax rates (2018)

Poland	**19.0**
Thailand	**20.0**
Russia	**20.0**
Turkey	**22.0**
South Korea	**25.0**
China	**25.0**
Indonesia	**25.0**
Spain	**25.0**
Chile	**26.0**
Canada	**26.5**
South Africa	**28.0**
Peru	**29.5**
Argentina	**30.0**
Mexico	**30.0**
Australia	**30.0**
Colombia	**33.0**
Brazil	**34.0**
India	**35.0**
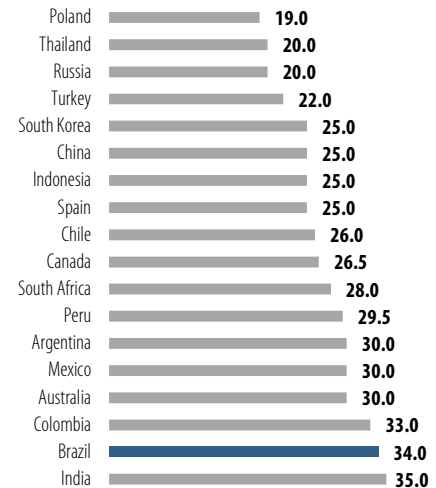
Average corporate tax rates
Source: Tax Rates Online, KPMG

10.3 Total tax rate (% of profit) (2018)
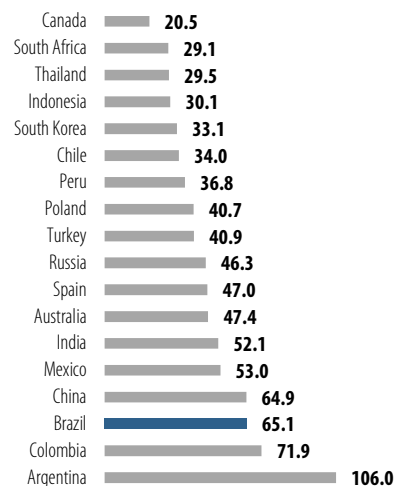
Canada	**20.5**
South Africa	**29.1**
Thailand	**29.5**
Indonesia	**30.1**
South Korea	**33.1**
Chile	**34.0**
Peru	**36.8**
Poland	**40.7**
Turkey	**40.9**
Russia	**46.3**
Spain	**47.0**
Australia	**47.4**
India	**52.1**
Mexico	**53.0**
China	**64.9**
Brazil	**65.1**
Colombia	**71.9**
Argentina	**106.0**

Total taxes paid by a company as a percentage of its profits (the profit or corporate income tax, social contributions and labor taxes paid by the employer, property taxes, property transfer taxes, dividend tax, capital gains tax, financial transactions tax, waste collection taxes, vehicle and road taxes, and any other small taxes or fees).
Source: Doing Business 2018, World Bank

10.4 Indirect tax rates (2018)

Canada	**5.0**
Thailand	**7.0**
Australia	**10.0**
Indonesia	**10.0**
South Korea	**10.0**
South Africa	**14.0**
Mexico	**16.0**
China	**17.0**
India	**18.0**
Brazil	**18.0**
Turkey	**18.0**
Peru	**18.0**
Russia	**18.0**
Chile	**19.0**
Colombia	**19.0**
Spain	**21.0**
Argentina	**21.0**
Poland	**23.0**
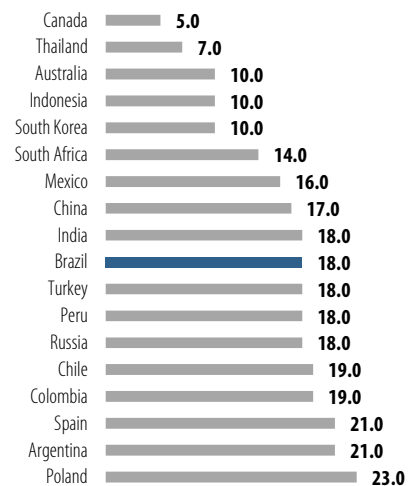
Average indirect tax rates
Source: Tax Rates Online, KPMG

11 Macroeconomic indicators sub-factor

China	7.00
Turkey	6.61
Colombia	6.30
Indonesia	6.16
Australia	5.99
Mexico	5.98
South Korea	5.95
Russia	5.86
Peru	5.83
Canada	5.77
Chile	5.65
Thailand	5.59
Poland	5.20
India	5.15
Spain	5.15
Brazil	5.01
South Africa	4.87
Argentina	4.14
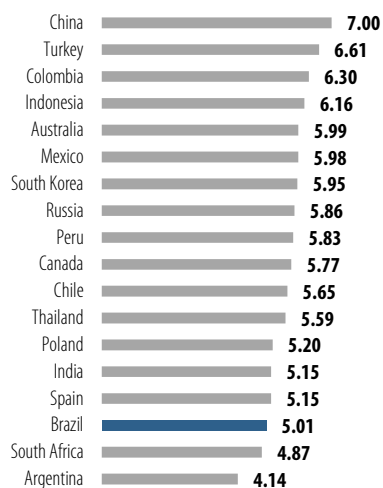
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

11.1 Inflation (2017)

Thailand	0.67
China	1.56
Canada	1.61
South Korea	1.94
Spain	1.96
Australia	1.97
Poland	1.98
Chile	2.18
Peru	2.80
Brazil	3.45
India	3.60
Russia	3.67
Indonesia	3.81
Colombia	4.31
South Africa	5.27
Mexico	6.04
Turkey	11.14
Argentina	25.68
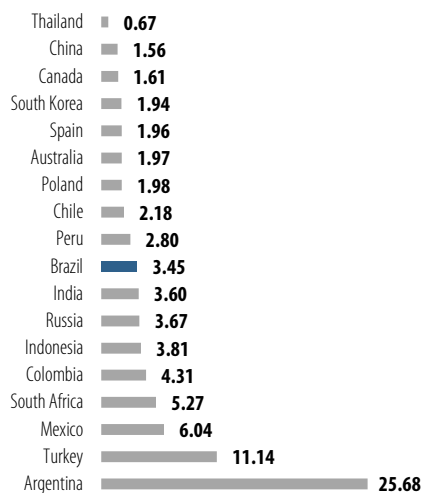
Annual percent change in consumer price index
Source: World Economic Outlook Database, Oct. 2018, IMF

11.2 Gross fixed capital formation (2017)

China*	44.41
Indonesia	32.16
South Korea	31.12
Turkey	29.81
India	28.49
Australia	24.03
Thailand	23.17
Canada	22.99
Colombia	22.85
Mexico	22.81
Russia	21.66
Peru	21.57
Chile	21.56
Spain	20.55
South Africa	18.73
Poland	18.01
Brazil	15.63
Argentina	14.81
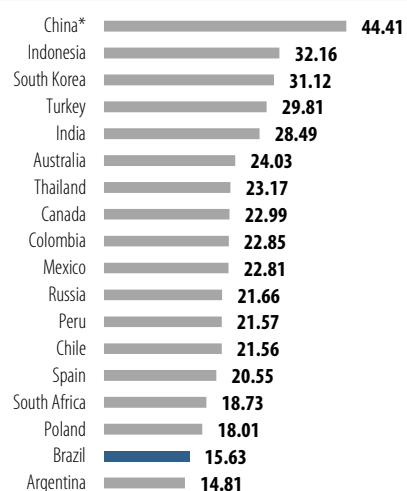
Percentage of GDP
Source: IMD World Competitiveness Yearbook 2018
*The source is World Economic Outlook Database, Oct. 2018, IMF

11.3 Direct investment flows inward (2017)

Colombia	4.70
Australia	3.54
Brazil	3.42
Peru	3.15
Mexico	2.70
Chile	2.32
Indonesia	2.27
India	1.96
Argentina	1.86
Russia	1.77
Thailand	1.76
Canada	1.60
China	1.37
Turkey	1.28
Poland	1.19
South Korea	1.11
South Africa	0.76
Spain	0.43
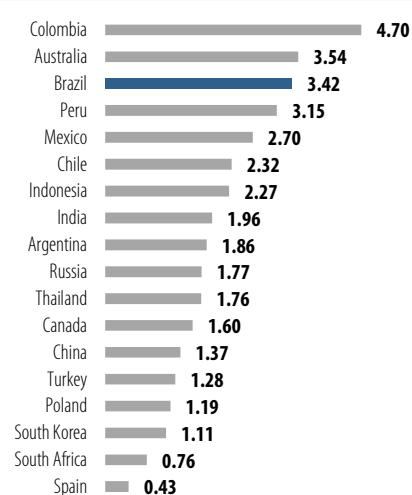
Percentage of GDP
Source: IMD World Competitiveness Yearbook 2018
Note: South Africa and India (2016)

11.4 Real effective exchange rate (Dec/2017)
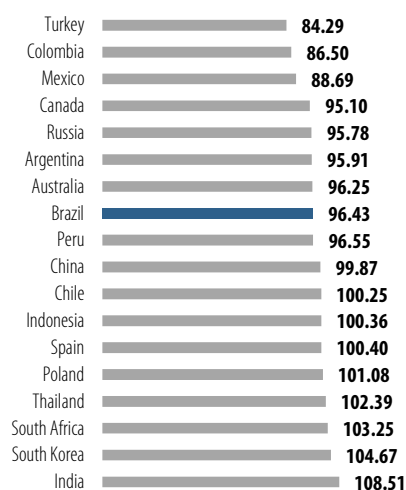
Turkey	**84.29**
Colombia	**86.50**
Mexico	**88.69**
Canada	**95.10**
Russia	**95.78**
Argentina	**95.91**
Australia	**96.25**
Brazil	**96.43**
Peru	**96.55**
China	**99.87**
Chile	**100.25**
Indonesia	**100.36**
Spain	**100.40**
Poland	**101.08**
Thailand	**102.39**
South Africa	**103.25**
South Korea	**104.67**
India	**108.51**

Real effective exchange rate (monthly average) on the reference date, expressed as a percentage of the arithmetic average of the monthly rates observed from January 2013 to December 2017.
Source: Calculated by CNI, based on the real effective exchange rate estimated by the Bank for International Settlements (BIS).

11.5 General government debt (2017)

Russia	**15.5**
Chile	**23.6**
Peru	**25.4**
Turkey	**28.3**
Indonesia	**28.8**
South Korea	**39.5**
Australia	**40.8**
Thailand	**41.9**
China	**47.0**
Colombia	**49.4**
Poland	**50.6**
South Africa	**53.0**
Mexico	**54.3**
Argentina	**57.6**
India	**71.2**
Brazil	**84.0**
Canada	**89.7**
Spain	**98.4**
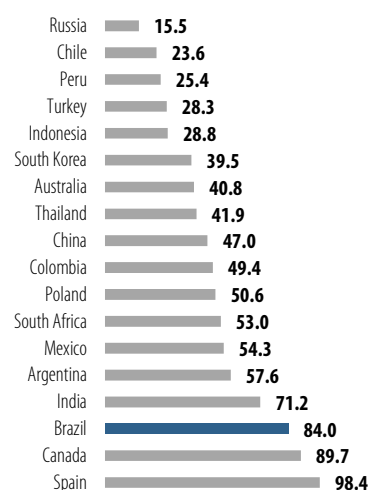
Percentage of GDP
Source: World Economic Outlook Database, Oct. 2018, IMF

11.6 General government net debt interest payments (2017)
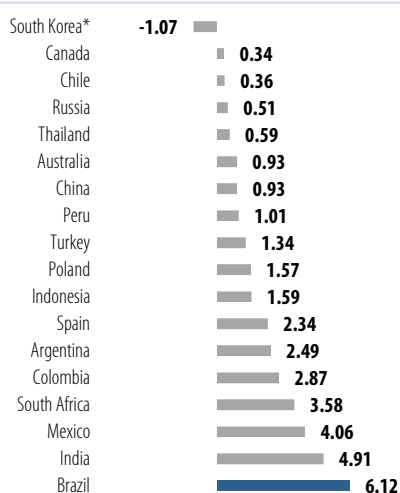
South Korea*	**-1.07**
Canada	**0.34**
Chile	**0.36**
Russia	**0.51**
Thailand	**0.59**
Australia	**0.93**
China	**0.93**
Peru	**1.01**
Turkey	**1.34**
Poland	**1.57**
Indonesia	**1.59**
Spain	**2.34**
Argentina	**2.49**
Colombia	**2.87**
South Africa	**3.58**
Mexico	**4.06**
India	**4.91**
Brazil	**6.12**

Interest payments on government debt, obtained by the difference between General government net lending/borrowing and General government primary net lending/borrowing. Percentage of GDP.
Source: Calculated by CNI, based on data from World Economic Outlook Database, Oct. 2018, IMF
*Interest revenues

12 Productive structure sub-factor

South Korea	**9.41**
China	**7.24**
Poland	**7.13**
Mexico	**7.11**
Thailand	**6.82**
Spain	**6.29**
Canada	**6.08**
Turkey	**5.25**
Russia	**4.93**
India	**4.81**
Brazil	**4.68**
Indonesia	**4.34**
Colombia	**4.29**
Chile	**3.93**
South Africa	**3.88**
Argentina	**3.08**
Australia	**2.86**
Peru	**2.43**

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

12.1 Economic Complexity Index (ECI) (2016)

South Korea	2.03
China	1.16
Poland	1.12
Mexico	1.11
Thailand	0.99
Spain	0.78
Canada	0.70
Turkey	0.37
Russia	0.23
India	0.19
Brazil	0.14
Indonesia	0.00
Colombia	-0.02
Chile	-0.16
South Africa	-0.18
Argentina	-0.50
Australia	-0.59
Peru	-0.76

The economic complexity index is based on the diversity of exports a country produces and their ubiquity, or the number of the countries able to produce them. Countries that can sustain a diverse range of productive know-how, including sophisticated, unique know-how, show high values for ECI. These countries can produce a wide diversity of goods, including complex products that few other countries can make.
Source: The Atlas of Economic Complexity, Center of International Development at Harvard University

13 Scale sub-factor

China	10.00
India	9.24
Russia	8.37
Brazil	8.26
Indonesia	8.26
Mexico	8.01
Turkey	7.94
South Korea	7.78
Canada	7.73
Spain	7.71
Australia	7.38
Poland	7.28
Thailand	7.23
Argentina	7.18
South Africa	6.98
Colombia	6.98
Chile	6.50
Peru	6.48
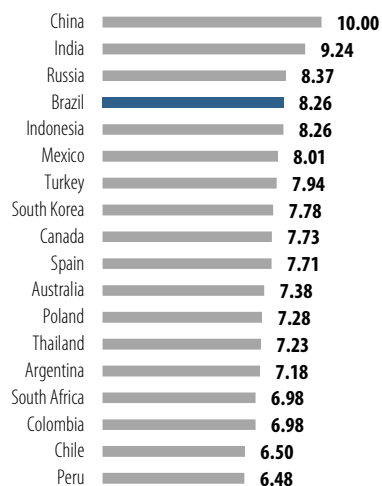
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

13.1 Domestic market size (2017)

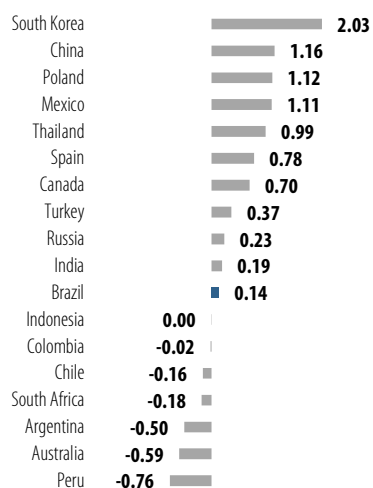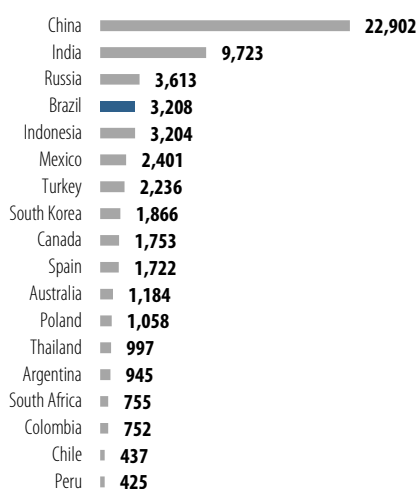|	
China	22,902
India	9,723
Russia	3,613
Brazil	3,208
Indonesia	3,204
Mexico	2,401
Turkey	2,236
South Korea	1,866
Canada	1,753
Spain	1,722
Australia	1,184
Poland	1,058
Thailand	997
Argentina	945
South Africa	755
Colombia	752
Chile	437
Peru	425

Sum of GDP (PPP) plus value of imports (PPP) of goods and services, minus value of exports (PPP) of goods and services (in billions of U.S. dollars).
Source: Calculated by CNI, based on data from World Bank.
Note: Thailand (2016).

14 Competition sub-factor

Poland	8.23
Spain	7.83
Canada	7.78
Australia	7.60
Indonesia	6.79
Peru	6.56
Russia	6.56
Chile	6.54
South Africa	6.25
Mexico	6.18
China	6.16
Turkey	6.04
India	5.80
Colombia	5.69
Thailand	5.63
South Korea	5.47
Brazil	5.23
Argentina	4.71
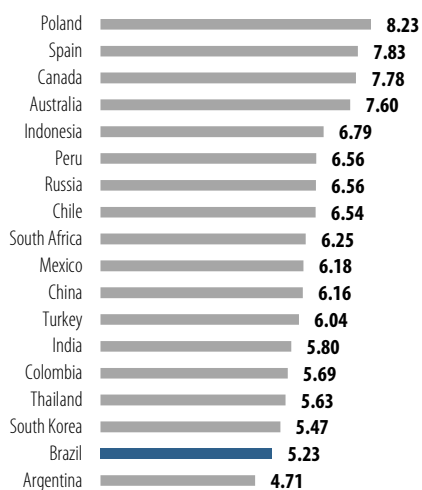
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

14.1 Trade tariffs (2017)
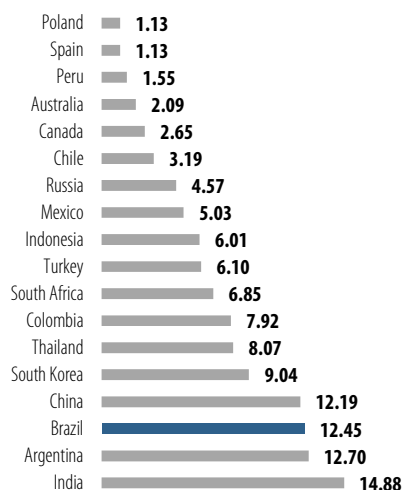
Poland	1.13
Spain	1.13
Peru	1.55
Australia	2.09
Canada	2.65
Chile	3.19
Russia	4.57
Mexico	5.03
Indonesia	6.01
Turkey	6.10
South Africa	6.85
Colombia	7.92
Thailand	8.07
South Korea	9.04
China	12.19
Brazil	12.45
Argentina	12.70
India	14.88

The weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country.
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: Thailand (2015).

14.2 Extent of market dominance (2017-2018, weighted average)
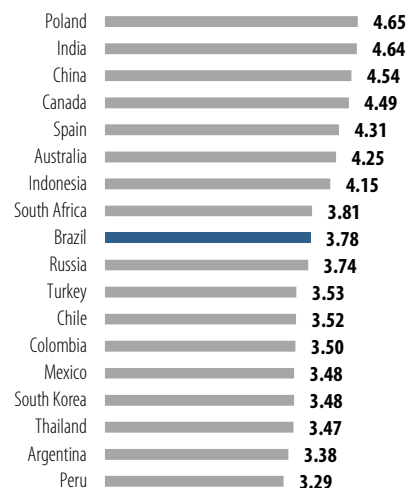
Poland	4.65
India	4.64
China	4.54
Canada	4.49
Spain	4.31
Australia	4.25
Indonesia	4.15
South Africa	3.81
Brazil	3.78
Russia	3.74
Turkey	3.53
Chile	3.52
Colombia	3.50
Mexico	3.48
South Korea	3.48
Thailand	3.47
Argentina	3.38
Peru	3.29

Variable generated from answers to the question: In your country, how do you characterize corporate activity? [1 = dominated by a few business groups; 7 = spread among many firms]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

15 Government efficiency sub-factor

Australia	9.46
Canada	9.39
Chile	7.36
South Korea	6.89
Spain	6.80
Poland	6.59
Colombia	5.51
Argentina	5.28
Brazil	5.23
South Africa	5.21
Mexico	4.97
India	4.67
Turkey	4.48
Thailand	4.46
China	4.25
Peru	4.22
Indonesia	4.00
Russia	3.87

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

15.1 Control of corruption (2017)

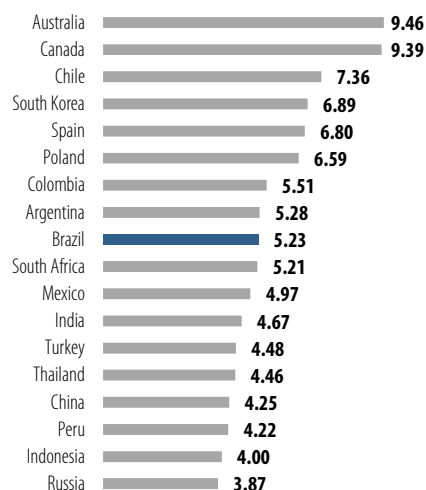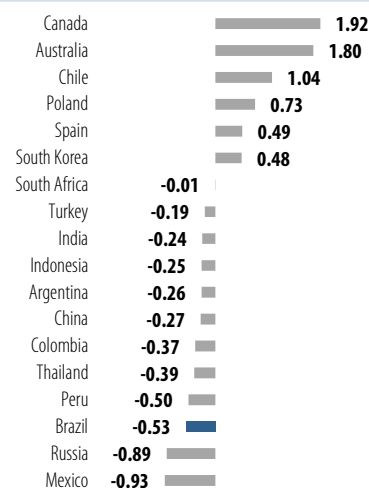|	
Canada	1.92
Australia	1.80
Chile	1.04
Poland	0.73
Spain	0.49
South Korea	0.48
South Africa	-0.01
Turkey	-0.19
India	-0.24
Indonesia	-0.25
Argentina	-0.26
China	-0.27
Colombia	-0.37
Thailand	-0.39
Peru	-0.50
Brazil	-0.53
Russia	-0.89
Mexico	-0.93

Index generated based on perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.
Source: The Worldwide Governance Indicators, 2018

15.2 Regulatory quality (2017)
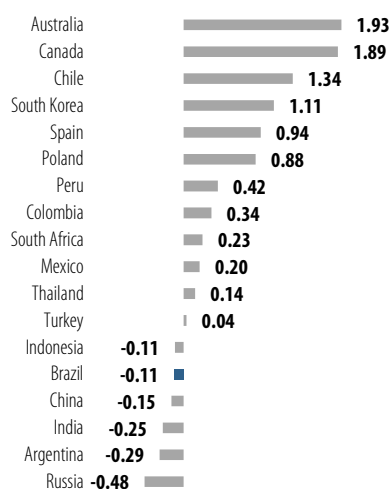
Country	Value
Australia	1.93
Canada	1.89
Chile	1.34
South Korea	1.11
Spain	0.94
Poland	0.88
Peru	0.42
Colombia	0.34
South Africa	0.23
Mexico	0.20
Thailand	0.14
Turkey	0.04
Indonesia	-0.11
Brazil	-0.11
China	-0.15
India	-0.25
Argentina	-0.29
Russia	-0.48

Index generated based on perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.
Source: The Worldwide Governance Indicators, 2018

15.3 Publicized laws and government data (2017-2018)

Country	Value
Australia	0.91
Canada	0.88
Brazil	0.72
Argentina	0.71
Spain	0.70
South Korea	0.70
Mexico	0.68
Colombia	0.67
Chile	0.66
Poland	0.62
India	0.55
South Africa	0.54
Russia	0.53
Thailand	0.46
Turkey	0.44
China	0.44
Peru	0.37
Indonesia	0.36

Index generated based on perceptions about access to information and text of laws publicized by the government, as well as based on the Open Data Index.
Source: Rule of Law Index ® 2017-2018, World Justice Project

16 Legal certainty sub-factor

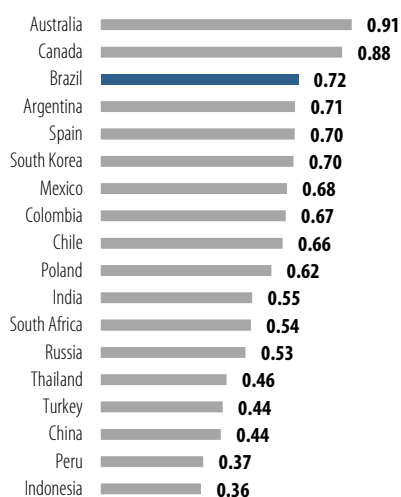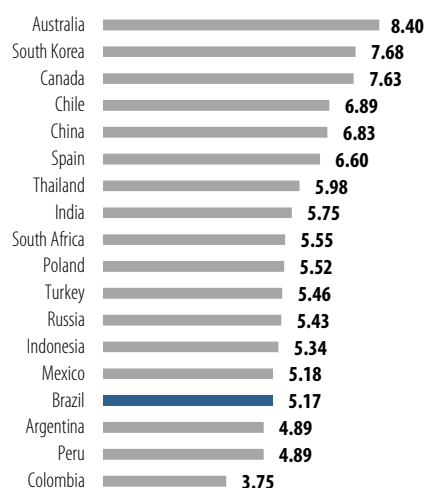| Country	Value
Australia	8.40
South Korea	7.68
Canada	7.63
Chile	6.89
China	6.83
Spain	6.60
Thailand	5.98
India	5.75
South Africa	5.55
Poland	5.52
Turkey	5.46
Russia	5.43
Indonesia	5.34
Mexico	5.18
Brazil	5.17
Argentina	4.89
Peru	4.89
Colombia	3.75

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

16.1 Rule of Law Index (2017)
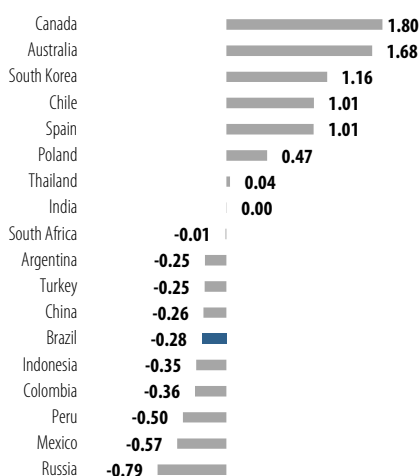
Country	Value
Canada	1.80
Australia	1.68
South Korea	1.16
Chile	1.01
Spain	1.01
Poland	0.47
Thailand	0.04
India	0.00
South Africa	-0.01
Argentina	-0.25
Turkey	-0.25
China	-0.26
Brazil	-0.28
Indonesia	-0.35
Colombia	-0.36
Peru	-0.50
Mexico	-0.57
Russia	-0.79

Index generated based on perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.
Source: The Worldwide Governance Indicators, 2018

16.2 Efficiency of legal framework in challenging regulations (2017-2018, weighted average)

India	4.51
Canada	4.28
Australia	4.19
China	4.09
Indonesia	3.99
Chile	3.62
South Africa	3.54
South Korea	3.48
Thailand	3.28
Russia	3.16
Spain	2.96
Mexico	2.89
Argentina	2.82
Peru	2.80
Turkey	2.68
Brazil	2.65
Colombia	2.63
Poland	2.44

Variable generated from answers to the question: In your country, how easy is it for private businesses to challenge government actions and/or regulations through the legal system? [1 = extremely difficult; 7 = extremely easy]
Source: The Global Competitiveness Report 2018, World Economic Forum
Note: China (2016-2017, weighted average); Turkey (2018).

16.3 Enforcing contracts (2018)

South Korea	84.15
Australia	79.00
China	78.97
Russia	72.18
Turkey	71.78
Spain	70.90
Thailand	67.91
Mexico	67.01
Brazil	66.00
Chile	65.79
Poland	64.36
Peru	60.70
Canada	57.13
Argentina	55.66
South Africa	54.10
Indonesia	47.23
India	41.19
Colombia	34.29

Distance to frontier (0-100 scale). Simple average of the scores in three indicators: time and cost for resolving a commercial dispute through local courts; the quality of judicial processes index (adoption of good practices that promote quality and efficiency in the court system).
Source: Doing Business 2019, World Bank

17 Red tape sub-factor

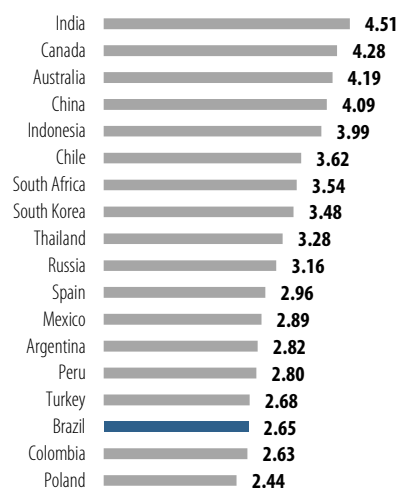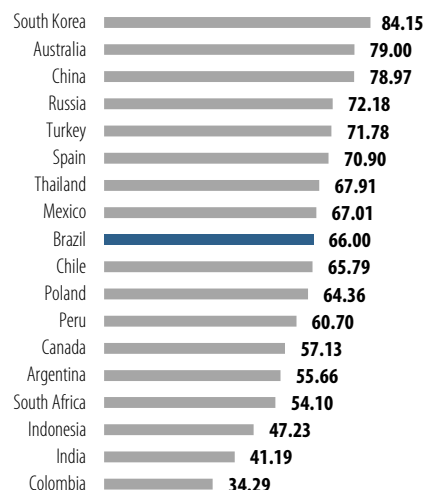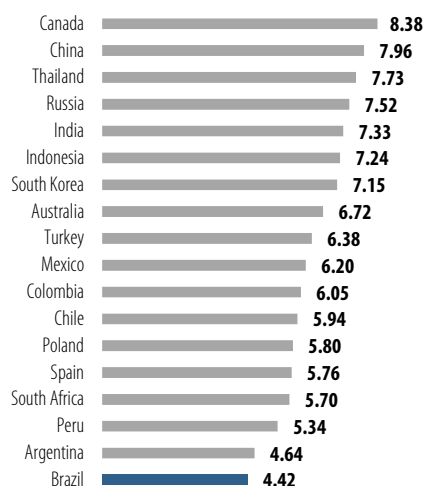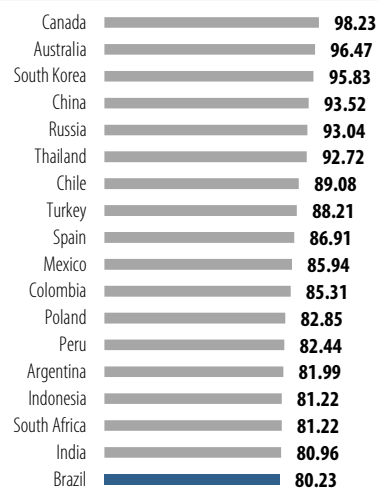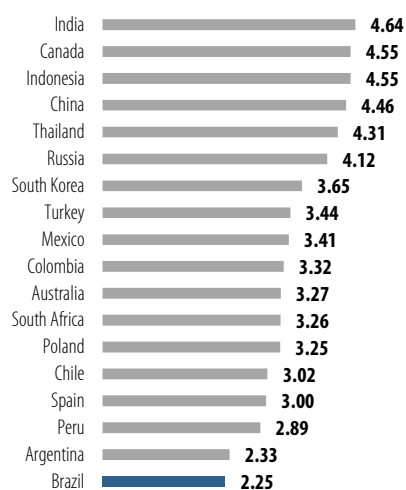|	
Canada	8.38
China	7.96
Thailand	7.73
Russia	7.52
India	7.33
Indonesia	7.24
South Korea	7.15
Australia	6.72
Turkey	6.38
Mexico	6.20
Colombia	6.05
Chile	5.94
Poland	5.80
Spain	5.76
South Africa	5.70
Peru	5.34
Argentina	4.64
Brazil	4.42

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

17.1 Starting a business (2018)

Canada	98.23
Australia	96.47
South Korea	95.83
China	93.52
Russia	93.04
Thailand	92.72
Chile	89.08
Turkey	88.21
Spain	86.91
Mexico	85.94
Colombia	85.31
Poland	82.85
Peru	82.44
Argentina	81.99
Indonesia	81.22
South Africa	81.22
India	80.96
Brazil	80.23

Distance to frontier (0-100 scale). Simple average of scores in four indicators: (1) procedures to legally start and formally operate a company (number); (2) time required to complete each procedure (calendar days); (3) cost required to complete each procedure (percentage of per capita income); (4) paid-in minimum capital (percentage of per capita income).
Source: Doing Business 2019, World Bank

17.2 Hiring and firing practices (2017-2018, weighted average)

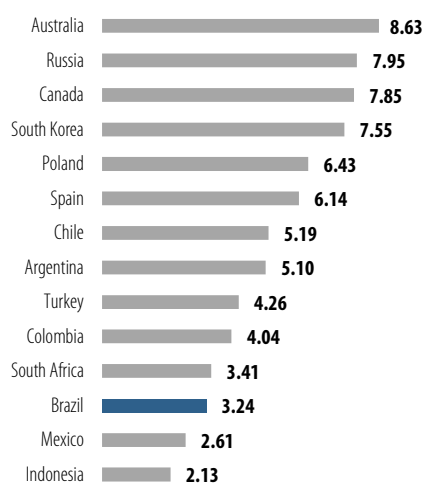|	
India	4.64
Canada	4.55
Indonesia	4.55
China	4.46
Thailand	4.31
Russia	4.12
South Korea	3.65
Turkey	3.44
Mexico	3.41
Colombia	3.32
Australia	3.27
South Africa	3.26
Poland	3.25
Chile	3.02
Spain	3.00
Peru	2.89
Argentina	2.33
Brazil	2.25

Variable generated from answers to the question: In your country, to what extent do regulations allow flexible hiring and firing of workers? [1 = not at all; 7 = to a great extent]
Source: The Global Competitiveness Report 2018, World Economic Forum
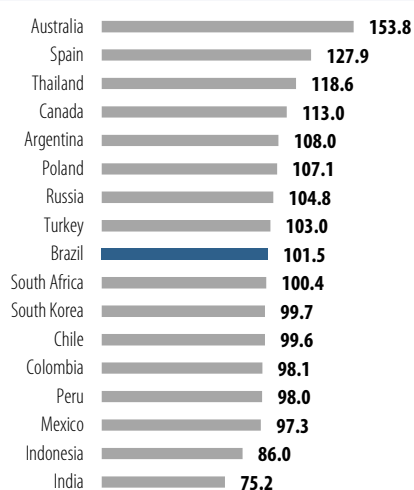Note: China (2016-2017, weighted average); Turkey (2018).

18 Educational attainment sub-factor

Australia	8.63
Russia	7.95
Canada	7.85
South Korea	7.55
Poland	6.43
Spain	6.14
Chile	5.19
Argentina	5.10
Turkey	4.26
Colombia	4.04
South Africa	3.41
Brazil	3.24
Mexico	2.61
Indonesia	2.13

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

18.1 Gross enrollment ratio in secondary education (2016)

Australia	153.8
Spain	127.9
Thailand	118.6
Canada	113.0
Argentina	108.0
Poland	107.1
Russia	104.8
Turkey	103.0
Brazil	101.5
South Africa	100.4
South Korea	99.7
Chile	99.6
Colombia	98.1
Peru	98.0
Mexico	97.3
Indonesia	86.0
India	75.2

Number of students enrolled in secondary level, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education.
Source: UNESCO Institute for Statistics.

18.2 Gross enrollment ratio in tertiary education (2016)
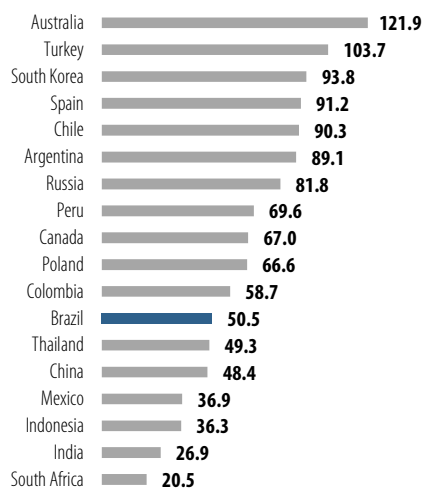
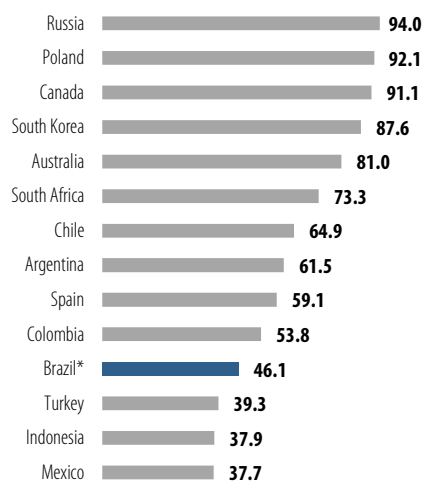|	
Australia	121.9
Turkey	103.7
South Korea	93.8
Spain	91.2
Chile	90.3
Argentina	89.1
Russia	81.8
Peru	69.6
Canada	67.0
Poland	66.6
Colombia	58.7
Brazil	50.5
Thailand	49.3
China	48.4
Mexico	36.9
Indonesia	36.3
India	26.9
South Africa	20.5

Number of students enrolled in tertiary level, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education.
Source: UNESCO Institute for Statistics.
Note: Indonesia (2017).

18.3 Percentage of adults who have attained at least upper secondary education (2017)

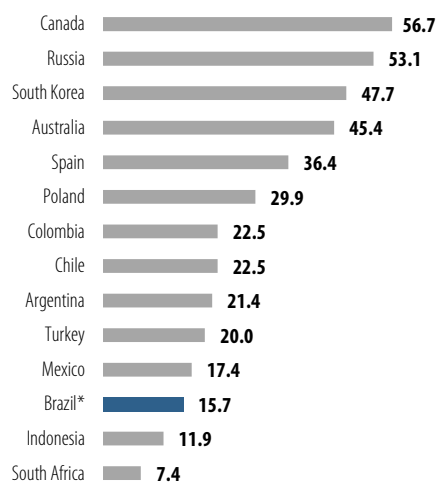|	
Russia	**94.0**
Poland	**92.1**
Canada	**91.1**
South Korea	**87.6**
Australia	**81.0**
South Africa	**73.3**
Chile	**64.9**
Argentina	**61.5**
Spain	**59.1**
Colombia	**53.8**
Brazil*	**46.1**
Turkey	**39.3**
Indonesia	**37.9**
Mexico	**37.7**

Percentage of adults aged between 25 and 64 who have attained at least upper secondary education.
Source: Education at a Glance 2018, OECD
Note: Chile and Russia (2015)
* Percentage of adults aged 25 years and above who have attained at least upper secondary education. Source: CNI estimate, based on data from IBGE (Continuous PNAD).

18.4 Percentage of adults who have attained tertiary education (2017)

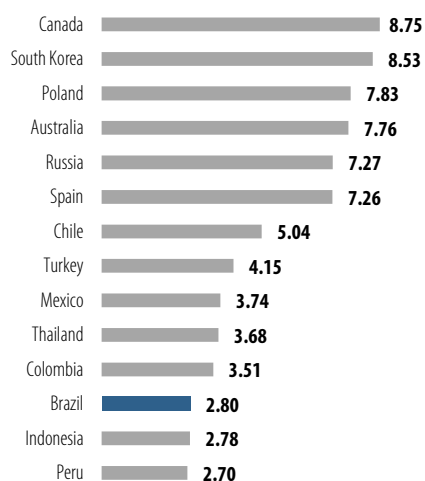|	
Canada	**56.7**
Russia	**53.1**
South Korea	**47.7**
Australia	**45.4**
Spain	**36.4**
Poland	**29.9**
Colombia	**22.5**
Chile	**22.5**
Argentina	**21.4**
Turkey	**20.0**
Mexico	**17.4**
Brazil*	**15.7**
Indonesia	**11.9**
South Africa	**7.4**

Percentage of adults aged between 25 and 64 who have attained tertiary education.
Source: Education at a Glance 2018, OECD
Note: Chile and Russia (2015)
* Percentage of adults aged 25 years or above who have attained tertiary education. Source: IBGE (Continuous PNAD).
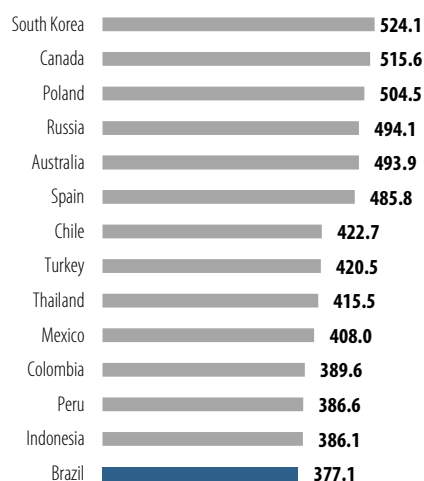
19 Educational assessment sub-factor

Canada	**8.75**
South Korea	**8.53**
Poland	**7.83**
Australia	**7.76**
Russia	**7.27**
Spain	**7.26**
Chile	**5.04**
Turkey	**4.15**
Mexico	**3.74**
Thailand	**3.68**
Colombia	**3.51**
Brazil	**2.80**
Indonesia	**2.78**
Peru	**2.70**

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

19.1 Performance in mathematics (2015)

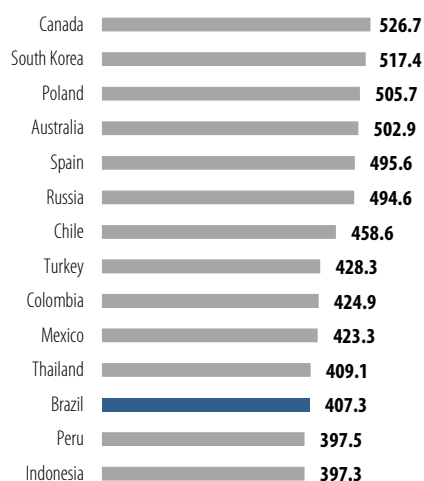|	
South Korea	**524.1**
Canada	**515.6**
Poland	**504.5**
Russia	**494.1**
Australia	**493.9**
Spain	**485.8**
Chile	**422.7**
Turkey	**420.5**
Thailand	**415.5**
Mexico	**408.0**
Colombia	**389.6**
Peru	**386.6**
Indonesia	**386.1**
Brazil	**377.1**

Average scores in math tests, 15-year-old students.
Source: PISA 2015, Excellence and Equity in Education, OECD.

19.2 Performance in reading (2015)

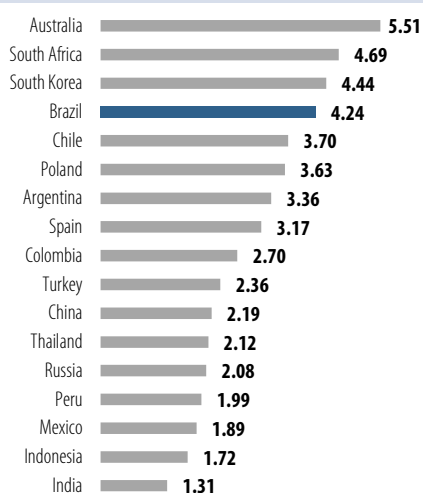|	
Canada	526.7
South Korea	517.4
Poland	505.7
Australia	502.9
Spain	495.6
Russia	494.6
Chile	458.6
Turkey	428.3
Colombia	424.9
Mexico	423.3
Thailand	409.1
Brazil	407.3
Peru	397.5
Indonesia	397.3

Average scores in reading tests, 15-year-old students.
Source: PISA 2015, Excellence and Equity in Education, OECD.

19.3 Performance in science (2015)
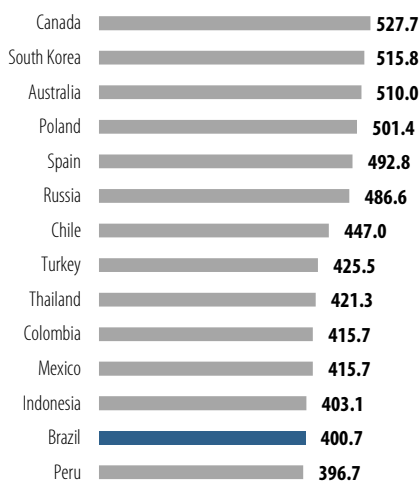
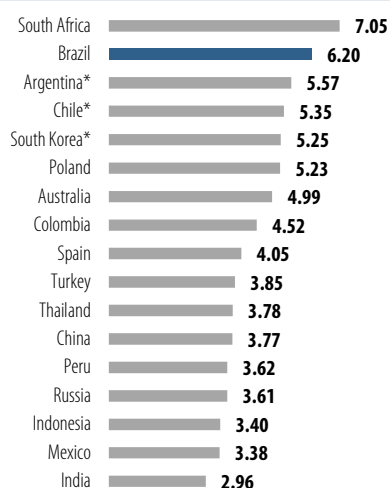|	
Canada	527.7
South Korea	515.8
Australia	510.0
Poland	501.4
Spain	492.8
Russia	486.6
Chile	447.0
Turkey	425.5
Thailand	421.3
Colombia	415.7
Mexico	415.7
Indonesia	403.1
Brazil	400.7
Peru	396.7

Average scores in science tests, 15-year-old students.
Source: PISA 2015, Excellence and Equity in Education, OECD.
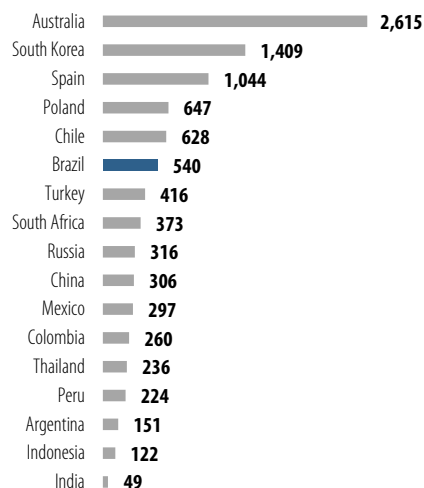
20 Expenditure on education sub-factor

Australia	5.51
South Africa	4.69
South Korea	4.44
Brazil	4.24
Chile	3.70
Poland	3.63
Argentina	3.36
Spain	3.17
Colombia	2.70
Turkey	2.36
China	2.19
Thailand	2.12
Russia	2.08
Peru	1.99
Mexico	1.89
Indonesia	1.72
India	1.31

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

20.1 Total public expenditure on education (2016)

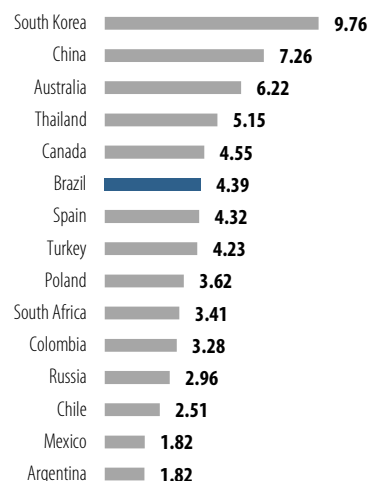|	
South Africa	7.05
Brazil	6.20
Argentina*	5.57
Chile*	5.35
South Korea*	5.25
Poland	5.23
Australia	4.99
Colombia	4.52
Spain	4.05
Turkey	3.85
Thailand	3.78
China	3.77
Peru	3.62
Russia	3.61
Indonesia	3.40
Mexico	3.38
India	2.96

Percentage of GDP
Source: IMD World Competitiveness Yearbook 2018
Note: South Korea, India, Poland and Spain (2015).
*The source is UNESCO Institute for Statistics.

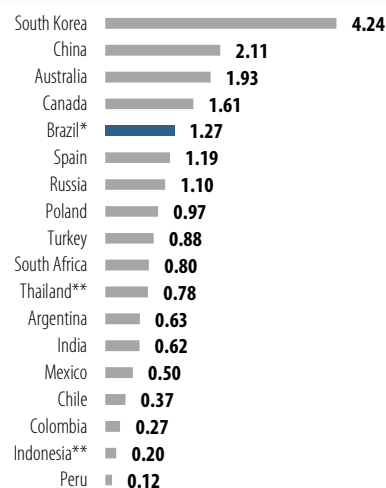## 20.2 Total public expenditure on education per capita (2016)

Australia	**2,615**
South Korea	**1,409**
Spain	**1,044**
Poland	**647**
Chile	**628**
Brazil	**540**
Turkey	**416**
South Africa	**373**
Russia	**316**
China	**306**
Mexico	**297**
Colombia	**260**
Thailand	**236**
Peru	**224**
Argentina	**151**
Indonesia	**122**
India	**49**

US$ per capita
Source: IMD World Competitiveness Yearbook 2018
Note: South Korea (2014); Chile, India, Poland and Spain (2015).
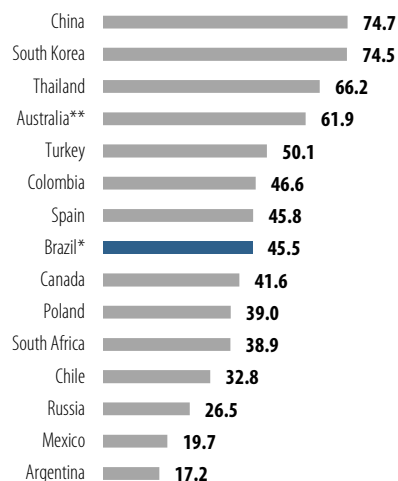
21 R&D efforts sub-factor

South Korea	**9.76**
China	**7.26**
Australia	**6.22**
Thailand	**5.15**
Canada	**4.55**
Brazil	**4.39**
Spain	**4.32**
Turkey	**4.23**
Poland	**3.62**
South Africa	**3.41**
Colombia	**3.28**
Russia	**2.96**
Chile	**2.51**
Mexico	**1.82**
Argentina	**1.82**

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

21.1 Gross expenditure on R&D (% of GDP) (2016)

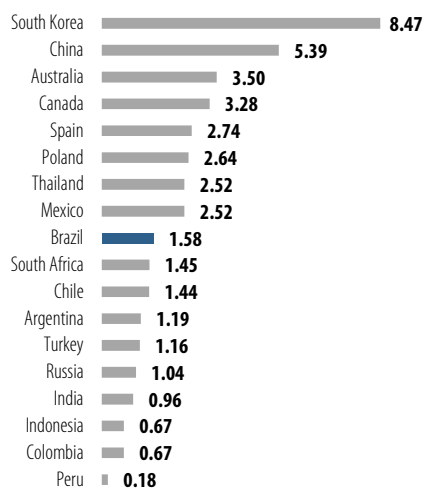|	
South Korea	**4.24**
China	**2.11**
Australia	**1.93**
Canada	**1.61**
Brazil*	**1.27**
Spain	**1.19**
Russia	**1.10**
Poland	**0.97**
Turkey	**0.88**
South Africa	**0.80**
Thailand**	**0.78**
Argentina	**0.63**
India	**0.62**
Mexico	**0.50**
Chile	**0.37**
Colombia	**0.27**
Indonesia**	**0.20**
Peru	**0.12**

Total expenditure on research and development (R&D) as a percentage of GDP
Source: UNESCO Institute for Statistics.
Note: South Africa, Argentina, Australia, India and Turkey (2015)
*The source is MCTIC
**The source is IMD World Competitiveness Yearbook 2018

21.2 Gross expenditure on R&D financed by business enterprise (% of total R&D expenditure) (2015)

China	**74.7**
South Korea	**74.5**
Thailand	**66.2**
Australia**	**61.9**
Turkey	**50.1**
Colombia	**46.6**
Spain	**45.8**
Brazil*	**45.5**
Canada	**41.6**
Poland	**39.0**
South Africa	**38.9**
Chile	**32.8**
Russia	**26.5**
Mexico	**19.7**
Argentina	**17.2**

Gross expenditure on research and development (R&D) financed by business enterprise as a percentage of total expenditure on R&D
Source: UNESCO Institute for Statistics.
*The source is MCTIC
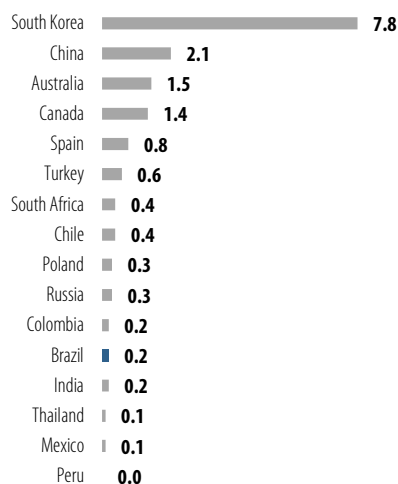** AThe source is Global Innovation Index 2018

22 Outcomes of R&D efforts sub-factor

South Korea	8.47
China	5.39
Australia	3.50
Canada	3.28
Spain	2.74
Poland	2.64
Thailand	2.52
Mexico	2.52
Brazil	1.58
South Africa	1.45
Chile	1.44
Argentina	1.19
Turkey	1.16
Russia	1.04
India	0.96
Indonesia	0.67
Colombia	0.67
Peru	0.18

Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

22.1 PCT international applications (2017)

South Korea	7.8
China	2.1
Australia	1.5
Canada	1.4
Spain	0.8
Turkey	0.6
South Africa	0.4
Chile	0.4
Poland	0.3
Russia	0.3
Colombia	0.2
Brazil	0.2
India	0.2
Thailand	0.1
Mexico	0.1
Peru	0.0

Number of international patent applications filed by residents at the Patent Cooperation Treaty (PCT) (per billion PPP$ GDP).
Source: Global Innovation Index 2018

22.2 Scientific and technical publications (2017)
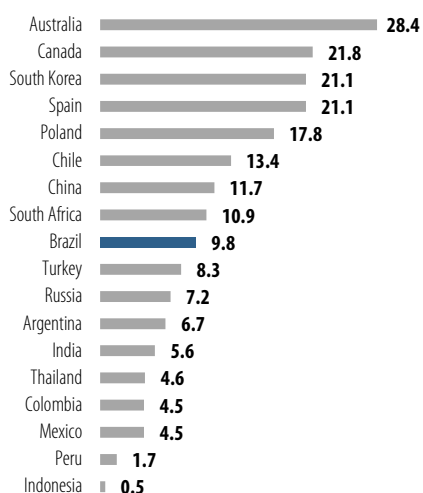
Australia	28.4
Canada	21.8
South Korea	21.1
Spain	21.1
Poland	17.8
Chile	13.4
China	11.7
South Africa	10.9
Brazil	9.8
Turkey	8.3
Russia	7.2
Argentina	6.7
India	5.6
Thailand	4.6
Colombia	4.5
Mexico	4.5
Peru	1.7
Indonesia	0.5

Number of scientific and technical journal articles (per billion PPP$ GDP). Articles counts are from a set of journals covered by the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI).
Source: Global Innovation Index 2018

22.3 High-tech exports (2016)

China	28.7
South Korea	24.6
Mexico	15.6
Thailand	15.5
Poland	7.2
Canada	5.4
Brazil	5.0
Spain	3.9
Indonesia	3.3
India	3.2
South Africa	2.5
Russia	2.3
Australia	2.2
Argentina	1.9
Colombia	1.6
Turkey	1.3
Chile	1.0
Peru	0.4
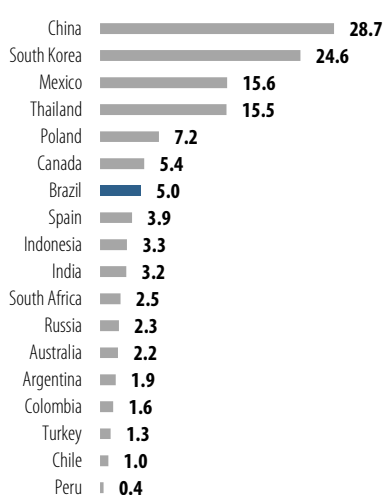
High-technology exports minus re-exports (% of total trade)
Source: Global Innovation Index 2018

APPENDIX A
METHODOLOGICAL CHANGES AND REVISED 2017–2018 GENERAL RANKING

In this edition (2018-2019), the determinants of competitiveness and the variables associated with the factors were reviewed. This review was intended to: allow for greater alignment with the key factors considered in the 2018-2022 Strategic Map for Industry and improve the quality of the measures used.

A first change was made to the structure of three competitiveness factors: Productive structure, scale and competition, Business environment and Technology and innovation. The Productive structure, scale and competition factor is the new version of the Competition and scale of the domestic market factor. It was expanded to include, among other structural elements with a bearing on competitiveness (competition scale and dynamics), an indicator linked to the configuration of the country's industry.

The Business environment factor, which was previously divided into the subfactors Government efficiency and Legal certainty, Red tape and Labor relations, is now composed of three subfactors: Government efficiency, Legal certainty and Red tape. This change made it possible to establish a direct relationship with the key factors of the 2018-2022 Strategic Map for Industry.

The other factor that was structured anew is that of Technology and innovation. In the previous structure, competitiveness was assessed considering, on the one hand, the role played by government in supporting science and technology and, on the other, the performance of companies in the areas of research and development (R&D) and innovation. This assessment is now based on quantitative indicators for R&D efforts on the part of both government and companies, and for outcomes (patents, published papers, and high-technology exports). In the previous version, the assessment was partly based on opinion indicators.

The review also involved replacing secondary sources to collect some of the indicators from primary data sources. This is the case of the variable Labor productivity in industry, associated with the Availability and cost of labor factor, and of the variable Domestic market size, associated with the Productive structure, scale and competition factor, which are measures that began to be calculated.

Finally, mention should be made of the inclusion, exclusion and replacement of variables, as a result of which the number of qualitative indicators was reduced (from 18 to 14) and the number of quantitative indicators was increased (from 38 to 48). In addition to the three factors with new structures, the factors Availability and cost of capital and Infrastructure and logistics were affected.

For purposes of comparison with the previous edition, the 2017-2018 ranking was revised based on the methodological changes that were made. For collecting data for the previous reference period, the most recent databases available were used. The revised 2017-2018 general ranking can be found below.

Figure A1 – Revised 2017–2018 General Ranking: competitive position of the 18 selected countries

Note: The overall ranking was built based on the simple average between the figures for each country in the nine competitiveness factors. For more details, see the methodological note in the fifth section.