BRAZIL COMPETITIVENESS REPORT 2019-2020

CNI
Brazilian National Confederation of Industry
THE FUTURE OF INDUSTRY

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REPORT
2019-2020

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SUMMARY

INTRODUCTION

The so-called Brazil Cost is one of the biggest challenges facing the country and, particularly, Brazilian Industry. In 2020, it has been 25 years since the National Confederation of Industry (CNI) held the Brazil Cost Seminar in partnership with the Brazilian National Congress. The event was intended to identify barriers to our competitiveness and highlight the importance of the subject.

CNI's main goal is to raise the overall competitiveness of the Brazilian economy as an essential task for achieving economic and social development. The launch of the first edition of the *Strategy Map for Industry* in 2005 was another milestone. With this initiative, we pointed out the main obstacles to Brazil's growth and suggested actions and policies to remove them.

The role of the *Brazil Competitiveness Report* is, in turn, that of monitoring the evolution of this topic. Since 2010, when it was launched, the publication has been checking Brazil's performance in relation to countries with similar characteristics to ours or that compete with us in the world market. Despite the time already devoted to addressing these obstacles, many of them have not yet been removed.

This edition of the report reinforces the urgency of measures to foster competitiveness. In comparison with the previous edition, Brazil recorded improvements in some areas, such as in reducing red tape, which resulted in an improved business environment. Even so, we are still in the next-to-last position in a ranking of 18 nations.

This is because other countries are also making progress through ongoing efforts to improve their respective competitive advantages. In addition, Brazil is still significantly behind those ahead of it, such as China (4th position in the ranking) and Chile (8th position).

There is no time to lose. We must take further actions to reduce the Brazil Cost and raise the country's competitiveness. In order to rise to the position of a developed nation, we need a strong, dynamic and competitive industry that looks to the future and is increasingly innovative, global and sustainable.

Robson Braga de Andrade
President of CNI

1 MAIN RESULTS

Brazil's overall average in the competitiveness ranking rises, but the country is still in second-to-last position

Brazil has reduced red tape for the second year in a row

Brazil remains in second-to-last position in the overall ranking of the Brazil Competitiveness Report among 18 selected economies, ahead only of Argentina and just behind Peru. Indonesia, India and Colombia are also in the bottom third of the ranking (six worst-ranked countries). Chile and Mexico – two other Latin American economies – are in the middle third (in 8th and 12th position, respectively). Poland, Russia, South Africa and Turkey are the other countries in the middle third of the ranking. The most competitive economies are the following ones: South Korea, Canada, Australia, China, Spain and Thailand.

Brazil is not among the six best-ranked countries (upper third) in any of the nine competitiveness factors assessed. In six of the nine factors, Brazil is in the bottom third of the ranking. **The most critical situation of the country is in the Financing factor, mainly due to the high costs of finance.** Brazil has the highest short-term real interest rate (8.8%) and the highest interest rate spread (32.2%). The second highest interest rate is 68% lower than the Brazilian rate (Russia: 5.2%) and the second highest spread is almost three times lower (Peru: 11.9%).

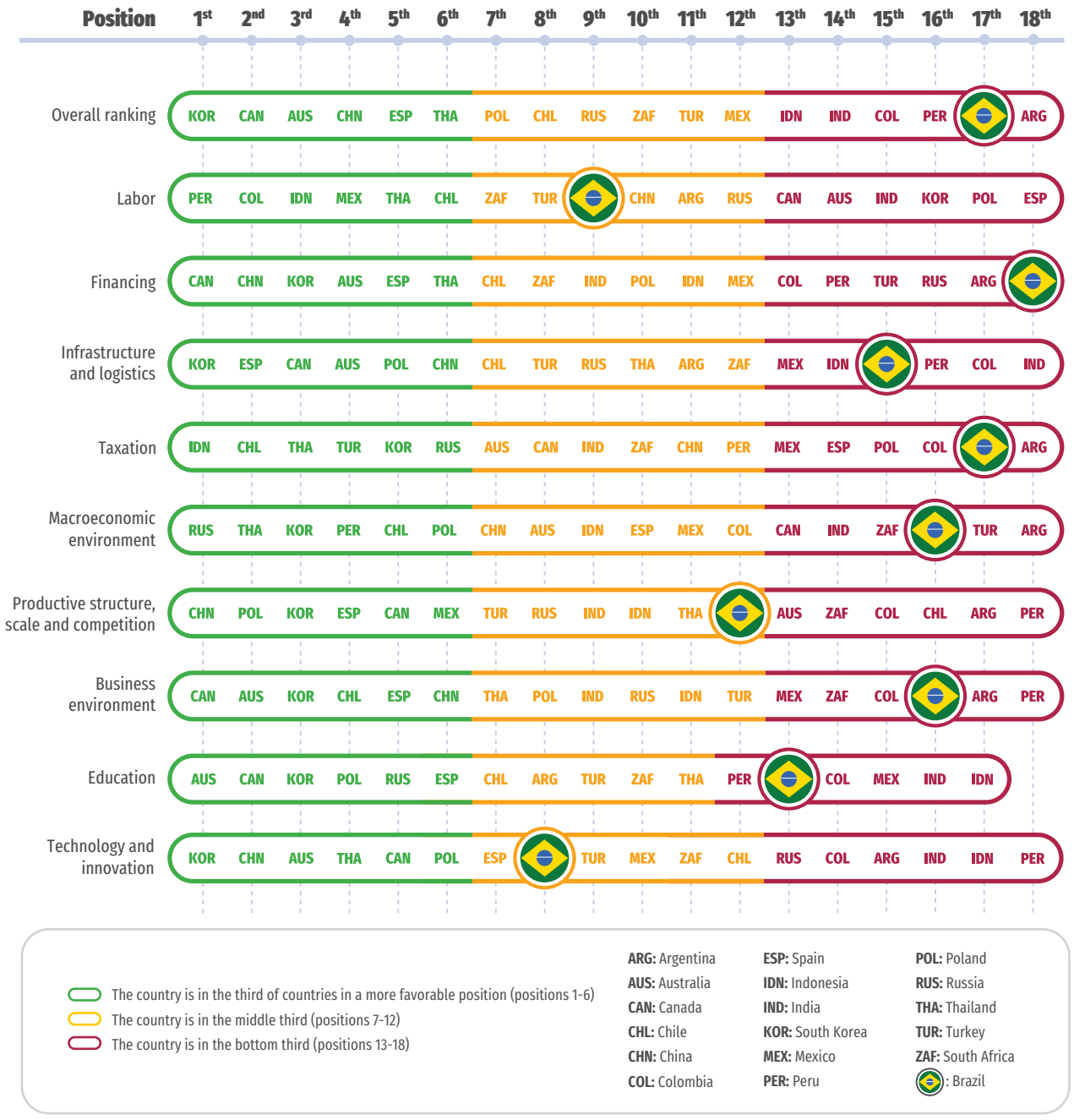
The Taxation factor is also critical: Brazil is in second-to-last position in the ranking of 18 countries, with the second highest tax burden and the lowest-quality tax system. The tax burden in Brazil accounts for almost one-third of GDP (32.3%) and for 65.1% of corporate earnings. It is almost the same as in countries whose per capita income is about twice that of Brazil, such as Spain (33.7%) and Poland (33.9%).

In the Macroeconomic environment and Business environment factors, Brazil is in third-to-last position, preventing investment from rising. The hostile environment for investment is mainly the result of the lack of fiscal balance, lack of legal certainty and excessive red tape. Government gross debt accounts for 88% of domestic GDP and nominal interest spending accounts for 5.6% of GDP – the third highest debt and the highest interest spending among the 18 countries included in the ranking.

Brazil is still among the worst-ranked countries in the ranking of the Infrastructure and logistics and Education factors. In all transportation modes assessed (road, rail, water and air transportation), based on both quantitative and qualitative variables (opinion surveys), Brazil is in the bottom third of the ranking. In Energy infrastructure, Brazil had the highest electricity cost for industrial clients (USD0.17 per Kwh) and the second worst quality of electricity supply (losses amount to about 16.1% of the energy generated).

In the Education factor, although Brazil has the second highest public expenditure on education as a proportion of GDP (5.6%), the results for quantity and quality of education are unsatisfactory. Among university-age Brazilians, only half (51%) are enrolled in higher education, a result that places Brazil in an intermediate position (11th position). In Chile, this percentage is 88.5% – the fifth highest one among 17 countries. Regarding quality, which was assessed based on the results of the PISA 2018 survey, the situation is even worse: Brazil's grades in math, reading and science tests place it in 13th position among 15 countries, ahead only of Argentina and Indonesia.

FIGURE 1 - COMPETITIVE POSITION OF THE 18 SELECTED COUNTRIES



Note: The overall ranking was built based on the simple average between the values recorded by each country in the nine competitiveness factors assessed. For more details, see the methodological note in Appendix A.

Brazil's disadvantage to other competing countries is lower in the following factors: Labor, Productive structure, scale and competition and Technology and innovation, in which it occupies the middle third of the ranking (9th, 12th and 8th position, respectively). In the Labor factor, although labor supply in Brazil places it in 10th position in terms of availability, its low labor productivity makes the cost of labor in Brazil one of the highest among the selected countries. In the Productive structure, scale and competition factor, Brazil has the 4th largest domestic market, and its productive structure was ranked 10th in terms of complexity. However, in order to increase productivity, it is important to provide more incentives to competition in the domestic market.

In the Technology and innovation factor, Brazil made the fifth highest investment in Research and Development (R&D) as a proportion of GDP (1.26%), while the share of companies in domestic investment was the ninth largest (45%). Regarding the results of R&D efforts, Brazil was ranked in an intermediate position in publication of scientific and technical papers in high-impact journals and in high-technology exports (a proxy of innovation in companies). Nevertheless, it was ranked 13th among 17 countries in number of international patent applications (inventions).

In the revised 2018-2019 ranking[1], Brazil lost positions in the Labor and Education factors and moved up one position in the Business environment factor. In the Labor factor, Brazil experienced a drop in the growth rate of its labor force, which considering its context of demographic transition, in which both mortality and fertility/birth rates are low, reinforces the importance of ensuring productivity gains. In the Education factor, Brazil was surpassed by Peru in the average of the Quality of education subfactor.

Brazil only made progress in the Business environment factor. For the second edition in a row, Brazil reduced the time required to start a business (from 79.5 to 20.5 and now to 17 days). In this edition, still in relation to the previous one, there was also a reduction in the cost for starting a business (from 5% to 4.2% of the per capita income), according to data from the Doing Business survey.

In the final calculation, Brazil's overall average has improved. The average of scores in the nine factors rose from 4.26 to 4.4 (an increase of 3.2%), showing that the situation in the country has improved. However, as Brazil is distant from the countries immediately above it in the ranking and because these countries have also made progress, the improvement observed in the Brazilian situation was not sufficient for the country to rise in the ranking.

1 To allow for comparisons, the 2018-2019 ranking of the Brazil Competitiveness Report was recalculated taking into account the methodological changes made in the current edition. For more information, see Appendix A, "Methodological Note."

2 COMPETITIVENESS FACTORS IN BRAZIL

2.1 LABOR

Because of its low productivity, Brazil was ranked among the last countries in terms of cost of labor

Brazil ranked ninth in the Labor factor and is in the middle third of the ranking of the 18 countries evaluated. This result reflects the country's competitive advantage in the Availability of labor subfactor. In the other subfactor, Cost of labor, the country was ranked among the last placed.

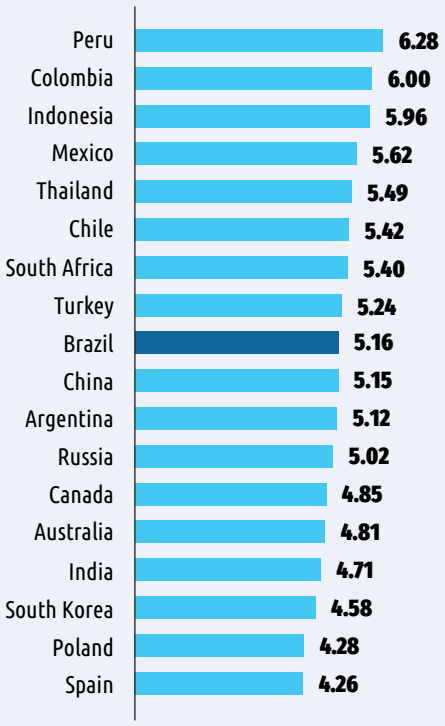
In Availability of labor, Brazil is in the middle third of the ranking in both variables associated with that subfactor. Brazil was ranked 8th among 18 countries in the size of its labor force (Economically Active Population) and 11th when the growth rate of this population is considered.

Regarding the Cost of labor, the country's poor performance is due to its low labor productivity in industry. In 2018, Brazil had the second lowest labor productivity among the 18 countries, surpassing only India. In Brazil, production per worker amounted to USD (PPP) 33,147, while in India it amounted to USD (PPP) 21,882. Australia had the best performance: its production per worker amounted to USD (PPP) 109,645 – more than three times higher than the one recorded in Brazil.

The gap between Brazil and the other countries is such that, despite having been ranked in the middle third in terms of the level of workers' compensation (9th position), Brazil is in 13th position in the Cost of labor subfactor, among the six lowest-ranking countries (bottom third).

In comparison with the previous ranking (revised 2018-2019 ranking), there was changes in the two subfactors associated with the Labor factor in Brazil. In the Cost of labor subfactor, labor productivity in industry – measured as output divided by employment – increased by 1.7%, but Brazil remained in second-to-last position. This low productivity growth was accompanied by a drop in the cost of

FIGURE 2 - LABOR FACTOR



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

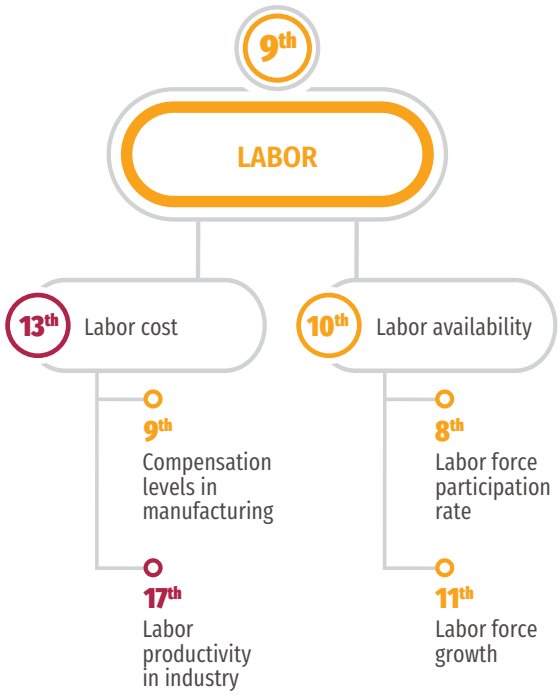
hourly wages, which fell from USD4.17 to USD3.94, as a result of which Brazil moved up one position in the subfactor, rising to 13th position.

In the Availability of Labor subfactor Brazil fell from 5th to 10th position, moving down from the upper third to the middle third of the ranking. Between 2017 and 2018, the growth rate of the Brazilian labor force fell from 1.97% to 0.93%, a change that led it to lose positions in the ranking.

In the final calculation, Brazil fell three positions in the Labor factor, moving down from the upper third to the middle third of the ranking to the 9th position – this was the only factor in which Brazil had been ranked in the upper third in the previous ranking.

Most of the countries evaluated recorded changes in the Labor factor, mainly as a result of changes in the growth rate of their labor force. Among them, the following ones stand out: South Africa (rose seven positions), Mexico and Thailand (both climbed four positions) and Turkey (lost four positions). With these changes, Mexico and Thailand rose to the upper third (4th and 5th position, respectively) of the ranking; South Africa rose to 7th position and Turkey fell to 8th position, both in the middle third of the ranking.

FIGURE 3 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE LABOR FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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)

2.2 FINANCING

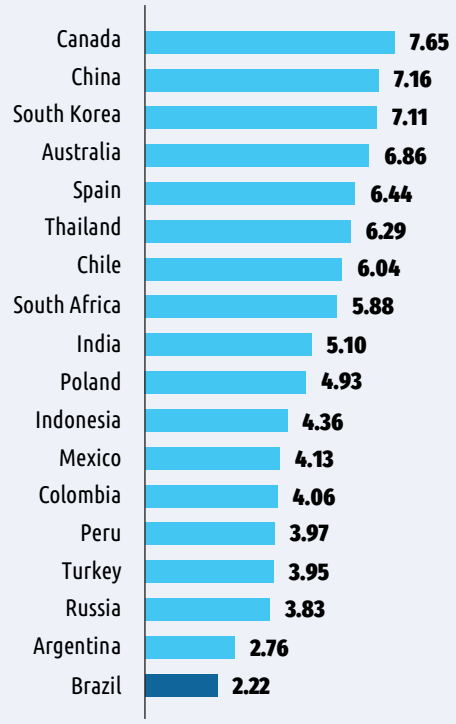
It is more expensive to obtain credit in Brazil than in any of the selected countries

Brazil is the worst-performing country in the ranking for the Financing factor among the 18 countries evaluated. Despite its position in the middle third of the ranking in two of the three dimensions evaluated – capital availability and performance of the financial system – the cost of capital in Brazil is much higher than in other countries.

In 2018, Brazil had the highest short-term real interest rate (8.8%) and the highest interest rate spread (32.2%). Among the 18 selected countries, Russia had the second highest short-term real interest rate (5.2%) and Peru had the second highest interest rate spread (11.9%) – a spread almost three times lower than the Brazilian one.

In the Capital availability subfactor, Brazil was ranked in the middle third, in the 11th position. In two of the three variables considered, the country is in an intermediate position: it was ranked 10th in Credit supply to the private sector and 9th in Stock market size, both as measured in relation to GDP. Its worst position in the ranking is in the variable Venture capital availability[2], a qualitative variable that reflects the availability of funds for innovation, in which it was ranked in the bottom third (13th position).

FIGURE 4 - FINANCING FACTOR



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

In relation to the performance of the financial system subfactor, Brazil was ranked 8th among 17 countries assessed. Despite being ranked among countries with the highest Banking sector assets (6th position among 18 countries), Brazil is third-to-last (16th position) in the credit rating issued by Fitch, Moody's and S&P. In 2018, Brazil had the third lowest score (25.3 on a 0-60 scale), surpassing only Turkey (23.3) and Argentina (17.3).

In comparison with the 2018-2019 ranking (revised version), Brazil moved up three positions in the Capital availability subfactor, rising from the bottom third to the middle third (11th position) of the ranking. This improvement was due to the Venture capital availability variable. On a scale of 1-7 (best performance), Brazil's score in this variable increased from 2.5 to 3.1 – the sharpest increase recorded among the 18 countries. Despite this increase, it remained in the bottom third of

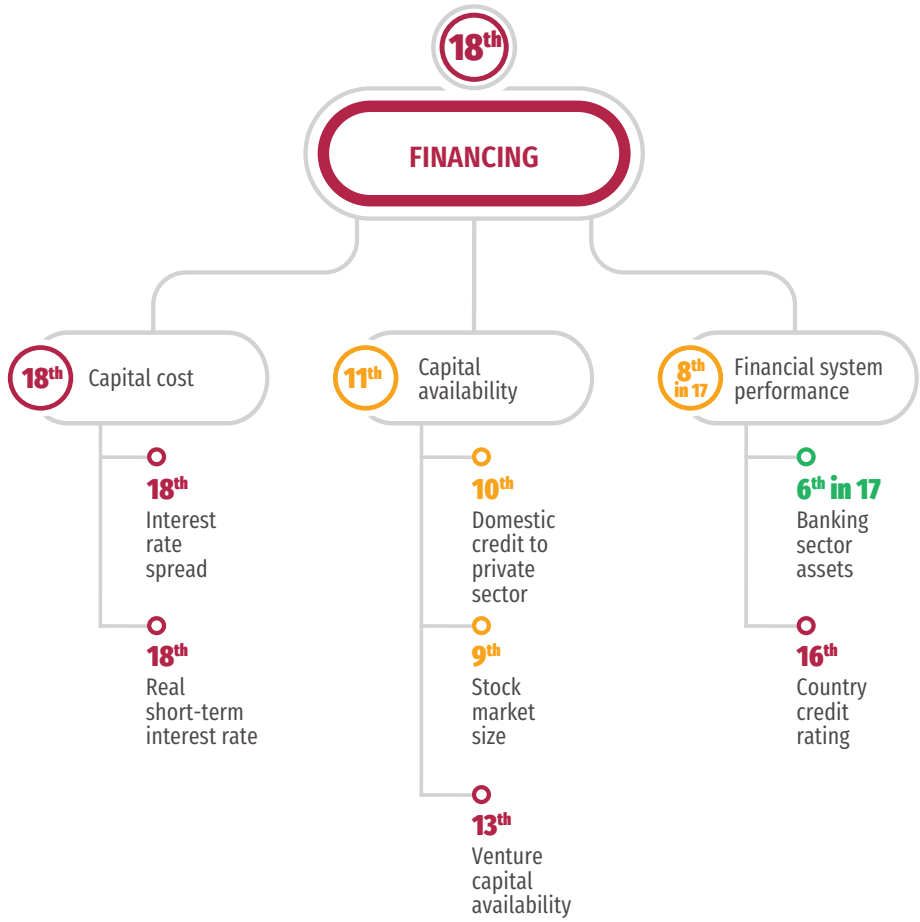
2 Variable generated based on the perception of how easy it is for companies with innovative, albeit risky projects to raise venture capital.

the ranking of the variable, rising from the second-to-last position to 13th position. However, this improvement was enough to raise Brazil's position in the subfactor.

The progress made in Capital availability was not enough to improve the Brazilian position in the Financing factor. This is due to the country's performance in the Capital cost subfactor, in which Brazil remains last in the ranking. As a result, Brazil remained in last position in the Financing factor.

In relation to the other countries, the case of Turkey stands out, as it lost four positions in the Financing factor, falling from the middle third to the bottom third of the ranking (15th position). Between 2017 and 2018, Turkey recorded the sharpest increase in interest rate spread (from 3.6% to 6.0%) and the highest increase in the real short-term interest rate (from -2.15% to 1,86%), falling nine positions in the Capital cost subfactor.

FIGURE 5 - BRAZIL'S POSITION IN THE RANKING OF THE FINANCING FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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)

2.3 INFRASTRUCTURE AND LOGISTICS

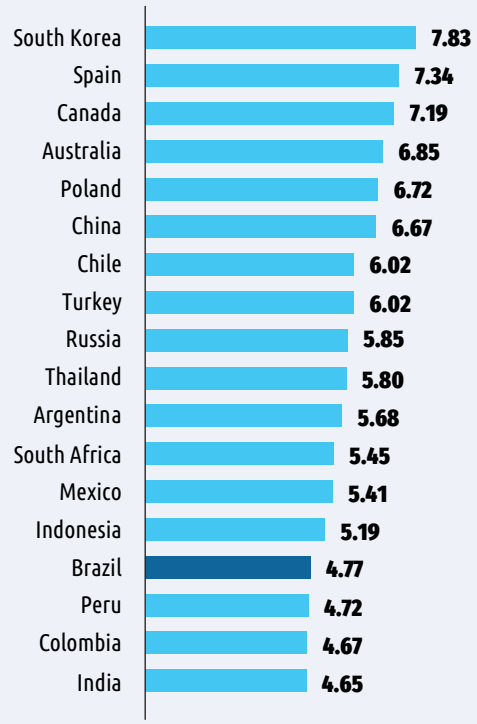
Brazil falls to second-to-last position in transportation infrastructure

In Infrastructure and logistics, Brazil ranked 15th among the 18 selected countries. In three of the four subfactors associated with this factor – Transportation infrastructure, Energy infrastructure and International logistics – the country is in the bottom third of the ranking (among the last six countries in the ranking). In Telecommunications infrastructure, Brazil is in an intermediate position (9th).

In all transportation modes – highways, railways, port and airport infrastructure – Brazil was ranked in the lowest positions, except in the Air transport (freight) variable. Consequently, the country is in second-to-last position in the Transport infrastructure subfactor. In each mode, Brazil's poor performance is determined based on a business opinion survey (that is, based on the opinion of service users) and on quantitative data. Brazil's best result was in the Air transport (freight) variable, which measures the volume of goods transported by air, in which it was ranked in an intermediate position (9th).

In the Energy infrastructure subfactor, Brazil ranked last among the 18 selected countries. Brazil has the highest cost of electricity for industrial clients and the second worst electricity supply in terms of its quality. In 2018, the cost of electricity in Brazil was USD0.17 per Kwh, while losses in transmission and distribution systems were in the order of 16.1% of all the electricity generated, according to 2016 data. The Availability of electricity variable is the only one in which Brazil is not in the bottom third of the ranking, occupying the 7th position among the 18 competitors.

FIGURE 6 - INFRASTRUCTURE AND LOGISTICS FACTOR



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

In International logistics, Brazil is in the bottom third of the ranking, in 14th position. Two variables are associated with this subfactor: Logistic Performance Index (LPI) and Time and cost to export and import, both computed by the World Bank. The country's logistics indicator is calculated based on qualitative and quantitative data collected from professionals in logistics. The other indicator measures the time and cost for exporting and importing goods. In the ranking for both, Brazil is in 14th position.

In relation to the 2018-2019 ranking (revised version), Brazil remained in 15th position in the Infrastructure and logistics factor. Among the subfactors, a change was recorded only in Transport infrastructure, in which it fell from 16th to 17th position. This decline in the ranking reflects the loss of positions in the variables Road connectivity index (from 13th to 14th), Liner shipping connectivity (from 16th to 17th) and Efficiency of air transport services (from 15th to 17th).

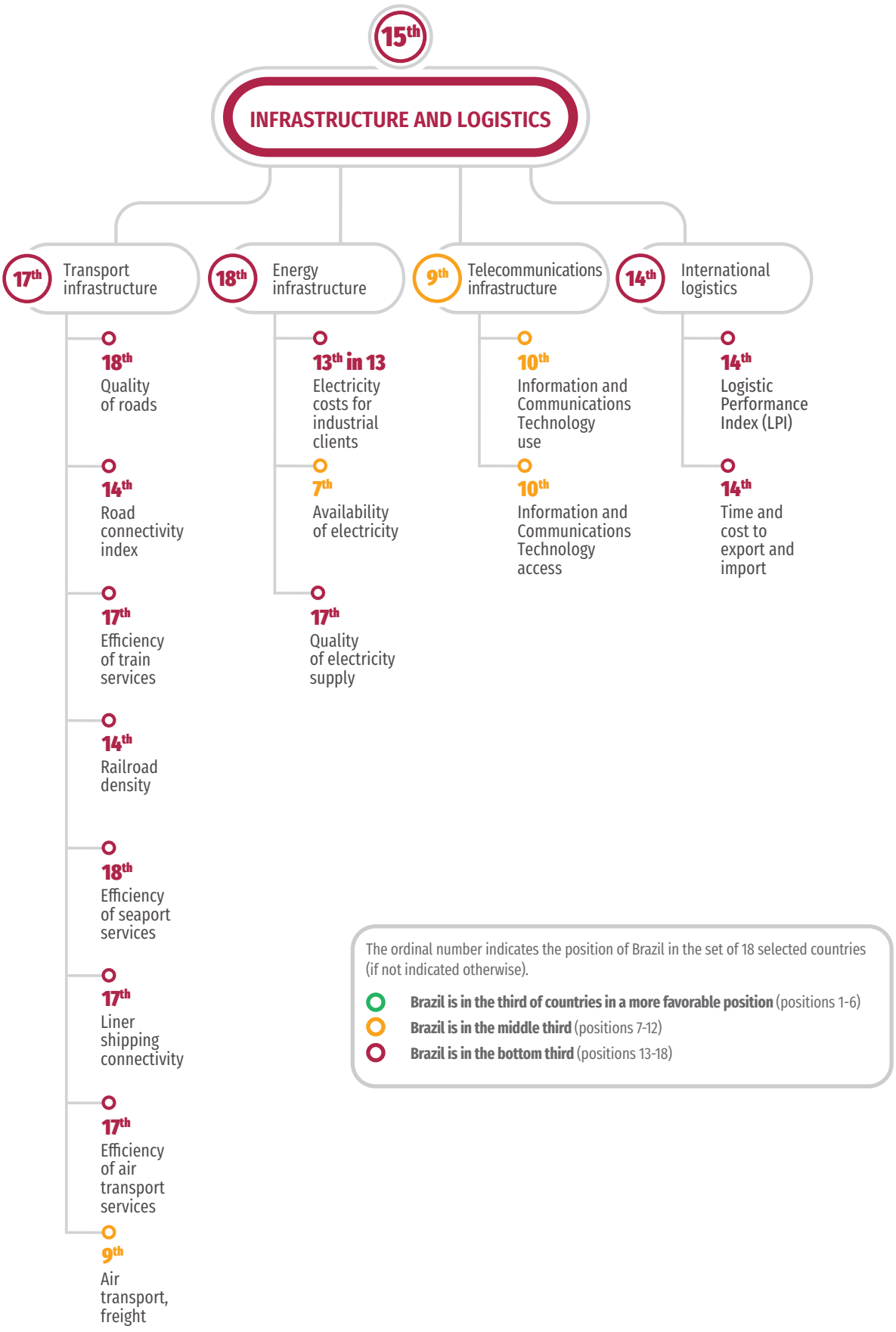
It is worth noting that, on a scale of 0-100 (best performance), the Road connectivity index[3] in Brazil increased from 64 in 2016 to 76 in 2019, according to data from the World Economic Forum. Of the 18 countries selected, only Mexico recorded a reduction in the indicator: from 93.5 in 2016 to 90 in 2019, dropping from 3rd to 8th position.

The gap between the Brazilian indicator and the indicators of better-positioned countries is such that, despite the increase, Brazil has not improved its position. On the contrary, it fell from 13th to 14th position, with South Korea entering the current ranking at 9th position[4]. Spain is first in the ranking, with an index of 100. Chile rose to 4th position, with an index of 95.8, and China to 5th, with an index of 95.7.

Brazil also lost positions in Use of ICTs. In ICT use, Brazil was surpassed by Chile (which moved up from 9th to 6th position) and Poland (which rose from 8th to 5th position), positioning itself behind China, which rose from 11th to 9th position. In Time and cost to export and import, Peru recorded an increase in the indicator, rising from 14th to 12th position, surpassing Brazil (14th) and Australia (13th), whose indicators remained stable over the period. Despite these changes, Brazil remained in the same positions in the average of the subfactors Telecommunications infrastructure (9th position) and International logistics (14th).

3 Calculation of the average speed and straightness of an itinerary comprising 10 or more cities, which account for at least 15% of the total population of the economy.
4 No information was available for South Korea in the previous ranking.

FIGURE 7 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE INFRASTRUCTURE AND LOGISTICS FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



2.4 TAXATION

Due to its high tax burden and low-quality tax system, Brazil ranked second-to-last in taxation

In the Taxation factor, Brazil ranked second-to-last among the 18 countries evaluated, ahead of Argentina. In the two dimensions evaluated –tax burden and quality of the tax system – Brazil is in the bottom third of the ranking.

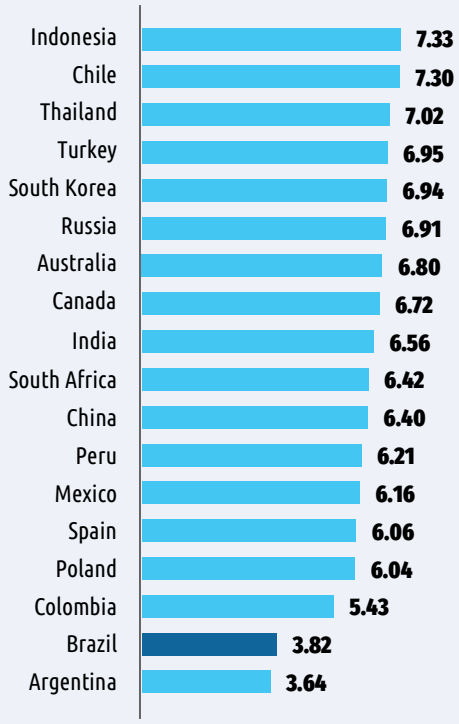
In the Tax burden subfactor, Brazil ranked 17th, surpassing only Argentina. In 2017, the tax revenue in Brazil accounted for almost one third of GDP (32.3%), lower only than that observed in Spain (33.7%) and Poland (33.9%), countries whose per capita income is about twice as high as the Brazilian one, according to data from 2018.

The tax burden in Brazil is also one of the highest when measured in relation to total corporate earnings. In 2019, the amount of taxes and contributions paid by Brazilian companies accounted for 65.1% of their profit, according to data from the Doing Business 2020 survey of the World Bank. The proportion calculated for Brazil is only lower than that calculated for Argentina (106.3%) and Colombia (71.2%).

In addition to its high tax burden, Brazil has a low-quality tax system. Brazil is in last position in the ranking of the subfactor Quality of the tax system. Quality is assessed based on two quantitative variables: Number of payments and Postfiling index, and on the qualitative variable Distortive effects of taxes and subsidies on competition.

Brazil is not in the bottom third of the ranking only in the Number of payments variable, in which it is in an intermediate position (11th), with 10 payments per year. It should be noted that this variable reflects the number of times a company pays taxes and contributions multiplied by the frequency of payment of each tax.

FIGURE 8 - TAXATION FACTOR



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

In the other quantitative variable – Postfiling index – the country is in the last position among the 18 countries. This indicator measures, on the one hand, the time to prepare tax refund requests and to comply with a corporate income tax correction and, on the other, the time to obtain the refund and to complete a tax inspection or audit. On a 0-100 scale, Brazil's average was only 7.8. Peru, which had the second worst performance, recorded an average of 19.2 – more than double that of Brazil.

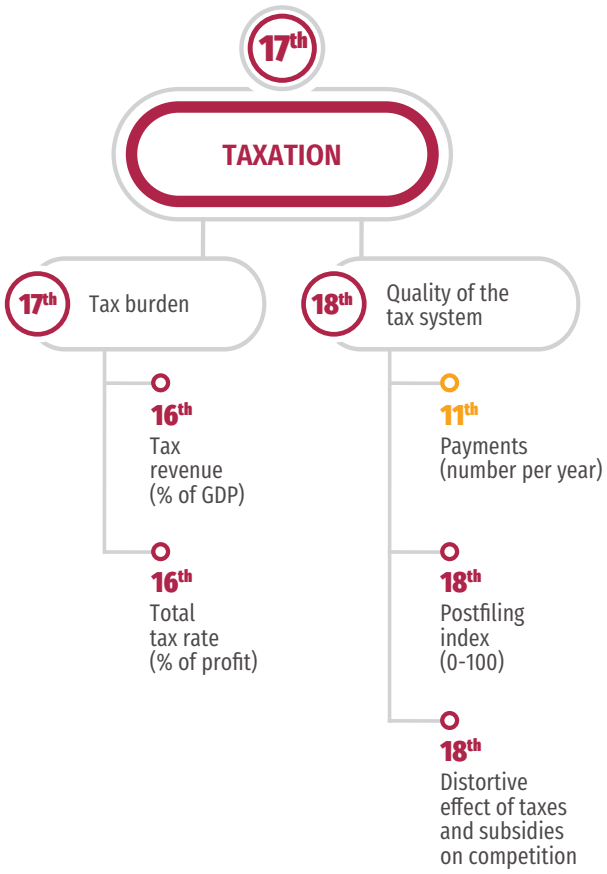
Brazil is also last placed in the variable Distortive effects of taxes and subsidies on competition, which is a qualitative variable based on the perception of entrepreneurs about such effects on competition.

In relation to the 2018-2019 ranking (revised version), Brazil recorded a change only in the ranking of the Tax revenue (% of GDP) variable, in which it fell from 15th to 16th position, changing positions with Canada. Between 2016 and 2017, the Brazilian tax revenue dropped from 32.1% to 32.3%, while the Canadian tax revenue declined from 32.7% to 32.2%.

In the final calculation, Brazil ranked second to last in the Taxation factor.

Also noteworthy is the performance of Turkey, which rose from 14th to 4th position in the Taxation factor, moving up from the bottom third to the upper third of the ranking. Between 2018 and 2019, Turkey carried out reforms that facilitated the payment of taxes in the country: it improved its online portal to comply with tax obligations and exempted certain investments from VAT (Value Added Taxes), according to the World Bank.

FIGURE 9 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE TAXATION FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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

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

2.5 MACROECONOMIC ENVIRONMENT

Brazil has the highest interest burden on one of the world's highest government debts

Brazil is in the bottom third of the ranking in the Macroeconomic environment factor, in 16th position among 18 countries evaluated. This result was mainly determined by the lack of fiscal balance, an important element to ensure a macroeconomic environment favorable to investment together with monetary stability and external balance.

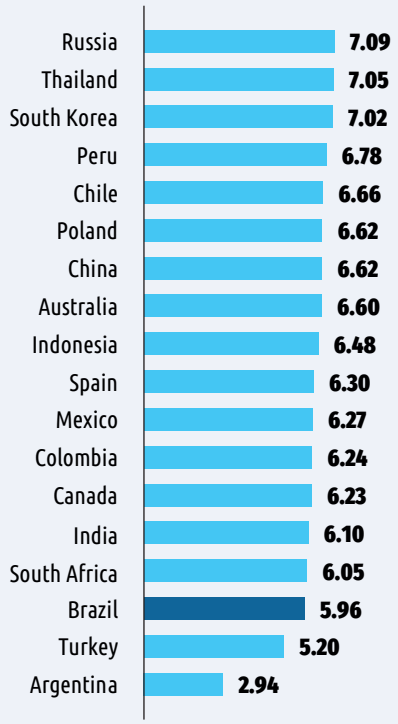
In the ranking of the General government debt variable, Brazil ranked third to last (16th position), ahead of Spain and Canada. In 2018, Brazil's general government debt accounted for 88% of GDP, while that of Spain and Canada accounted for 97% and 90%, respectively.

The assessment of fiscal balance is also complemented with debt cost data. Brazil has the largest spending on nominal interest (general governement net debt interest payments): in 2018, interest spending accounted for 5.6% of its GDP. In Spain and Canada, spending on nominal interest accounted for 2.3% and 0.3% of GDP, respectively.

Brazil is also among the last in the Monetary balance subfactor, ranking 14th. In 2018, the inflation rate in Brazil was 3.7%, lower only to the rates recorded in Argentina (34.3%), Turkey (16.3%), Mexico (4.9%) and South Africa (4.6%), according to consumer price index data from the IMF's World Economic Outlook database.

Regarding the External balance, Brazil recorded a deficit in current transactions amounting to 0.8% of GDP in 2018. This result placed Brazil in 7th position among the 18 countries, in the middle third of the ranking. In 2018, most countries recorded a deficit in current transactions. In Argentina, the deficit amounted to 5.3% of GDP – the worst result among the 18 countries. Only five countries recorded a surplus: Russia (6.8%), Thailand (6.4%), South Korea (4.4%), Spain (0.9%) and China (0.4%).

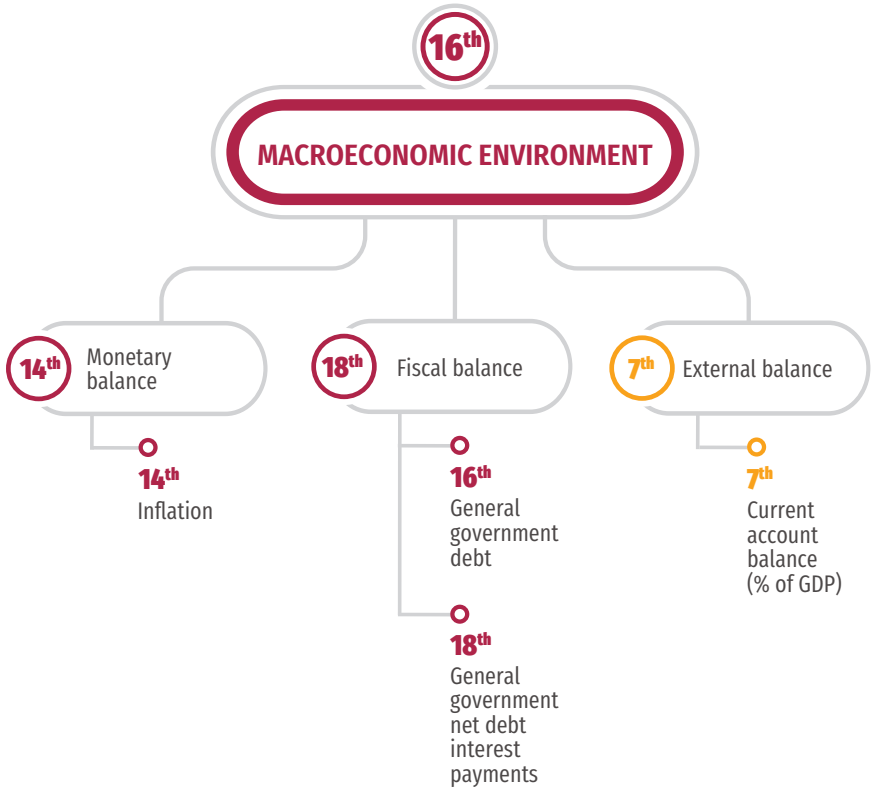
FIGURE 10 - MACROECONOMIC ENVIRONMENT FACTOR



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

In comparison with the 2018-2019 ranking (revised version), Brazil recorded a change only in the Monetary balance subfactor, in which it fell from 10th to 14th position, declining from the middle third to the bottom third of the ranking. Between 2017 and 2018, the inflation rate in Brazil rose from 3.4% to 3.7%. In the final calculation, the country ranked 16th in the Macroeconomic environment factor.

FIGURE 11 - BRAZIL'S POSITION IN THE RANKING RELATED TO THE MACROECONOMIC ENVIRONMENT FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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

2.6 PRODUCTIVE STRUCTURE, SCALE AND COMPETITION

Stimulating domestic competition may improve competitiveness

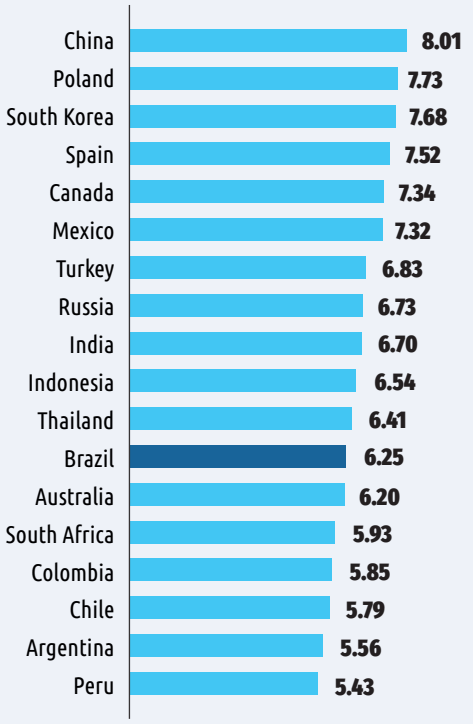
In the Productive structure, scale and competition factor, Brazil is in the middle third of the ranking, in 12th position among the 18 selected countries. It is in the bottom third of the ranking, in third-to-last position, only in the Competition subfactor.

Brazil's best position is in the Scale subfactor, in the upper third of the ranking, with the fourth largest domestic market – behind only to those of China, India and Russia.

In Productive structure subfactor the Economic Complexity Index (ECI) variable reflects the country's ability to produce a greater diversity of goods, including complex products, i.e. goods that only a few countries can produce. In 2017, the productive structure in Brazil was the 10th most complex among the 18 countries. South Korea is the most economically complex country, according to the ECI index.

In relation to the Competition subfactor, the negative effect on Brazil's competitiveness reflects, above all, its performance in the Trade tariffs variable. In Extent of market dominance, a variable that is also associated with the subfactor and based on perceptions of market concentration, the country occupies an intermediate position (8th).

FIGURE 12 - PRODUCTIVE STRUCTURE, SCALE AND COMPETITION FACTOR



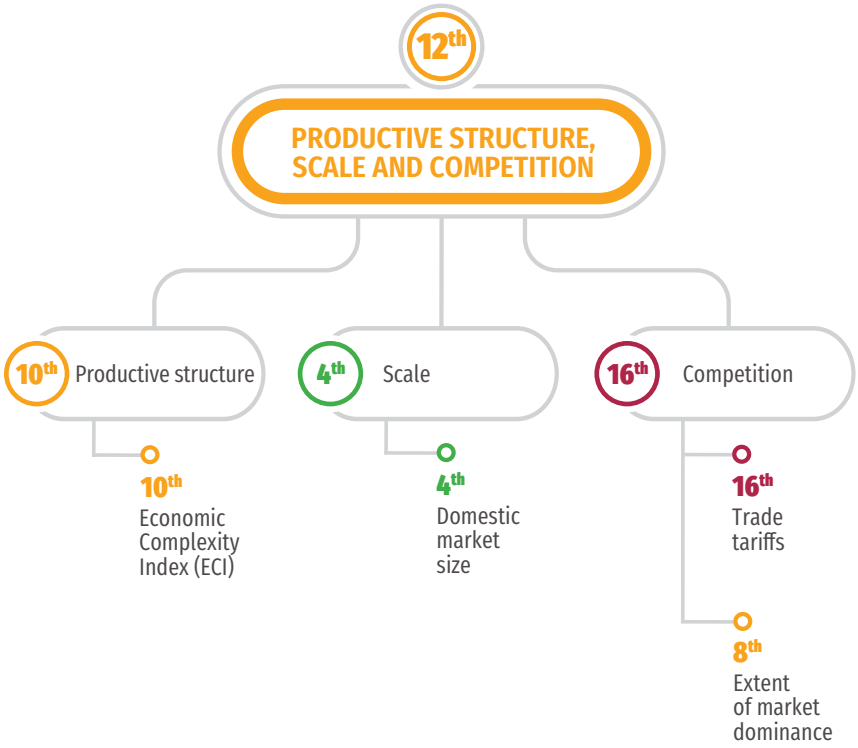
Source: CNI
Note: Average scores (0 = worst performance; 10 = best performance)

In 2018, Brazil had the second highest average tariff charged on imports of goods (12.34%) among 17 countries[5], ahead of India, whose rate was 14.43%. With lower tariffs, just ahead of Brazil, Argentina (11.31%) and China (11.12%) ranked 15th and 14th, respectively. Both Spain and Poland ranked first, with a rate of 1.12%.

As compared to the 2018-2019 ranking (revised version), Brazil remained in 12th position in the Production structure, scale and competition factor. The country recorded a change only in the qualitative variable Extent of market dominance, a ranking in which it rose from 9th to 8th position, changing positions with South Africa.

5 No data is available for Thailand. The last available data is for 2015 (8.1%).

FIGURE 13 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE PRODUCTIVE STRUCTURE, SCALE AND COMPETITION FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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)

2.7 BUSINESS ENVIRONMENT

Brazil reduces red tape for the second year in a row

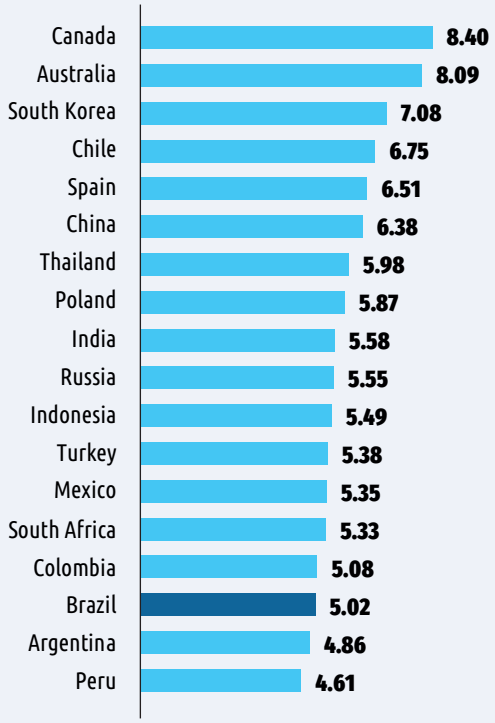
Brazil has one of the three worst environments for doing business among the 18 countries evaluated, ranking 16th in the Business environment factor. Argentina ranked 17th and Peru ranked last. Brazil's poor result mainly reflects its lack of legal certainty and excessive red tape.

In Legal certainty, Brazil ranks 15th, at the bottom third of the ranking. In this factor, regulatory aspects impacting on the private sector directly are evaluated based on perceptions about assurance of compliance with legal norms (aspects related to contract enforcement, property rights, law enforcement and justice) and about how easy it is to question government actions and regulations through the legal system, and on indicators of efficiency in contract enforcement.

Brazil is in next-to-last position (17th position) in the qualitative variable Efficiency of the legal framework in challenging regulations, with the second lowest score (2.66 on a 1-7 scale), higher only than the score obtained by Poland (2.52). In the other variables associated with the subfactor – Enforcing contracts and Rule of Law Index – the country is in the middle third of the ranking (11th and 12th position, respectively).

Also in relation to Red tape, Brazil is among the six lowest-ranking countries, in 16th position. This subfactor is composed of two variables: Starting a business, which measures the time and cost to complete the procedures to start a business, and Hiring and firing practices, a qualitative variable based on perceptions about the flexibility of rules for hiring and firing workers. In both variables, the country is in the bottom third of the ranking (in 15th and 16th position, respectively).

FIGURE 14 - BUSINESS ENVIRONMENT FACTOR



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

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

This is the only subfactor in which Brazil is not in the bottom third of the ranking, occupying an intermediate position (9th). This result is due to the positive performance of the country in the variable Publicized laws and government data , in which it obtained the third highest average score among the 18 countries evaluated (0.72 on a 0-1 scale, with 1 being the highest score). In the other variables associated with the subfactor – Control of corruption and Regulatory quality – it is in the bottom third of the ranking, in the 15th and 17th positions.

In comparison with the previous ranking (revised 2018-2019 version), Brazil recorded a change only in the Red tape subfactor, in which it moved up two positions, from the last (18th) to the third to last (16th). Brazil recorded improvements in both variables associated with this subfactor.

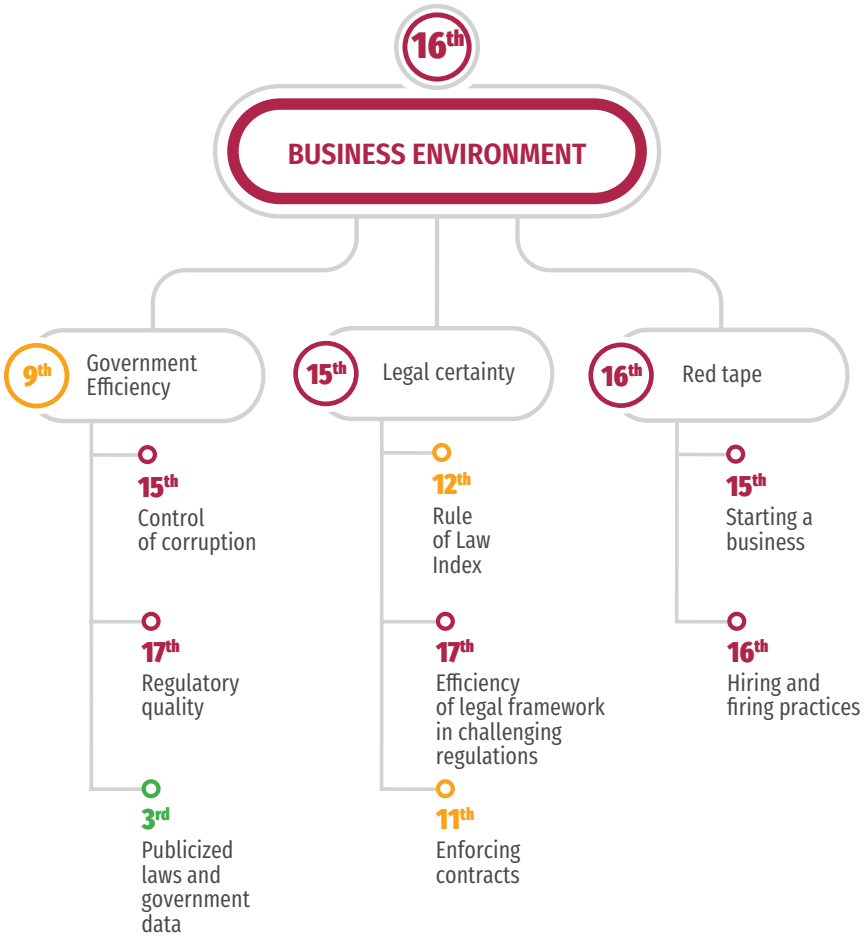
In Starting a business, Brazil recorded a reduction in the time to start a business (from 20.5 to 17 days) and in the cost to start a business (it accounted for 5% of per capita income and dropped to 4.2%), according to data from the World Bank's Doing Business 2019 and 2020 surveys. As a result, it rose from 17th to 15th position, surpassing Argentina and South Africa.

It is worth noting that other competitors also made progress in the Starting a business indicator, preserving or increasing its advantage from Brazil. Colombia, which rose from 11th to 9th position, reduced the number of procedures for starting a business from 8 to 7 and the time to start a business from 11 to 10 days. Chile, which occupies the 7th position, reduced the number of procedures for starting a business from 7 to 6 and the time and cost to start a business from 6 to 4 days and from 5.7% of per capita income to 2.7%, respectively.

Brazil also moved up two positions in the ranking of Hiring and firing practices, which is based on the perception of entrepreneurs about the flexibility of labor relations in the country. Between 2018 and 2019, Brazil's score increased from 2.25 to 2.76 (on a scale of 1 to 7, with 7 being the best performance) – the highest growth recorded among the 18 countries. As a result, it rose from 18th to 16th position, surpassing Peru and Argentina.

In the final calculation, Brazil moved up one position in the Business environment factor, surpassing Argentina. However, the gap between Brazil and the best-ranked countries is such that despite this progress it remained in the bottom third of the ranking, in 16th position.

FIGURE 15 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE BUSINESS ENVIRONMENT FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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)

2.8 EDUCATION

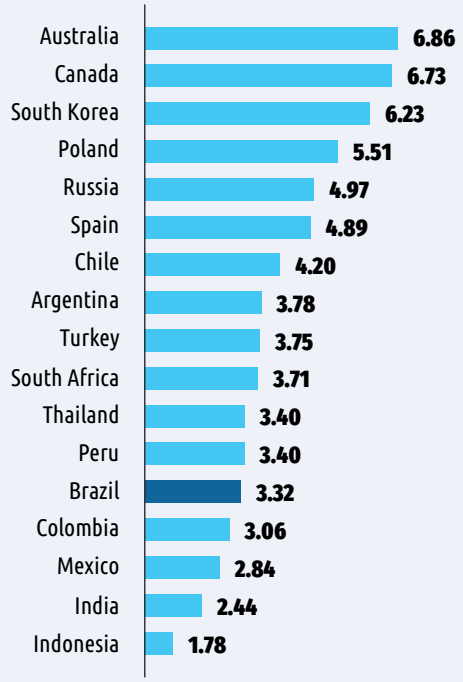
Results in dissemination and quality of education are unsatisfactory in relation to the high investment made

In the Education factor, Brazil is at the bottom third of the ranking, in 13th position among 17 countries assessed[6]. Although Brazil has the second highest public expenditure on education (as a proportion of GDP), it is one of the worst-ranked countries in terms of dissemination and quality of education.

In 2016, public funds for education in Brazil accounted for 5.6% of GDP, according to the Education at a Glance 2019 survey of the OECD. Of the 18 countries assessed, only South Africa recorded a higher percentage than that of Brazil (5.9%)[7]. Even though Brazil is in the middle third of the ranking of public spending per capita (7th position), in the average of the subfactor Expenditure on education it is in the upper third, with the fourth best average.

However, its high investment in education has not been translating into satisfactory results. In the Educational attainment subfactor, Brazil ranks 13th among the 17 countries assessed (no data is available for China). The four variables associated with this subfactor assess the percentage of people in secondary and higher education and the percentage of those who completed high school and college.

FIGURE 16 - EDUCATION FACTOR



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

Brazil is not in the bottom third of the ranking only in relation to the number of enrollments in higher education. In 2017, 51% of Brazilian students at college age were actually enrolled in higher education, which places Brazil in an intermediate position (11th position among 17 countries). Chile, another Latin American country evaluated, ranks 5th, with 88% of its students enrolled in higher education.

Regarding the Educational assessment subfactor, the situation in Brazil is even worse: it ranked third to last among 15 countries assessed[8]. The quality of education is assessed based on the results of PISA, the Program for International Student Assessment carried out by the OECD every three years. In practice, PISA applies reading, science and math tests to 15-year-old students from over 90 countries.

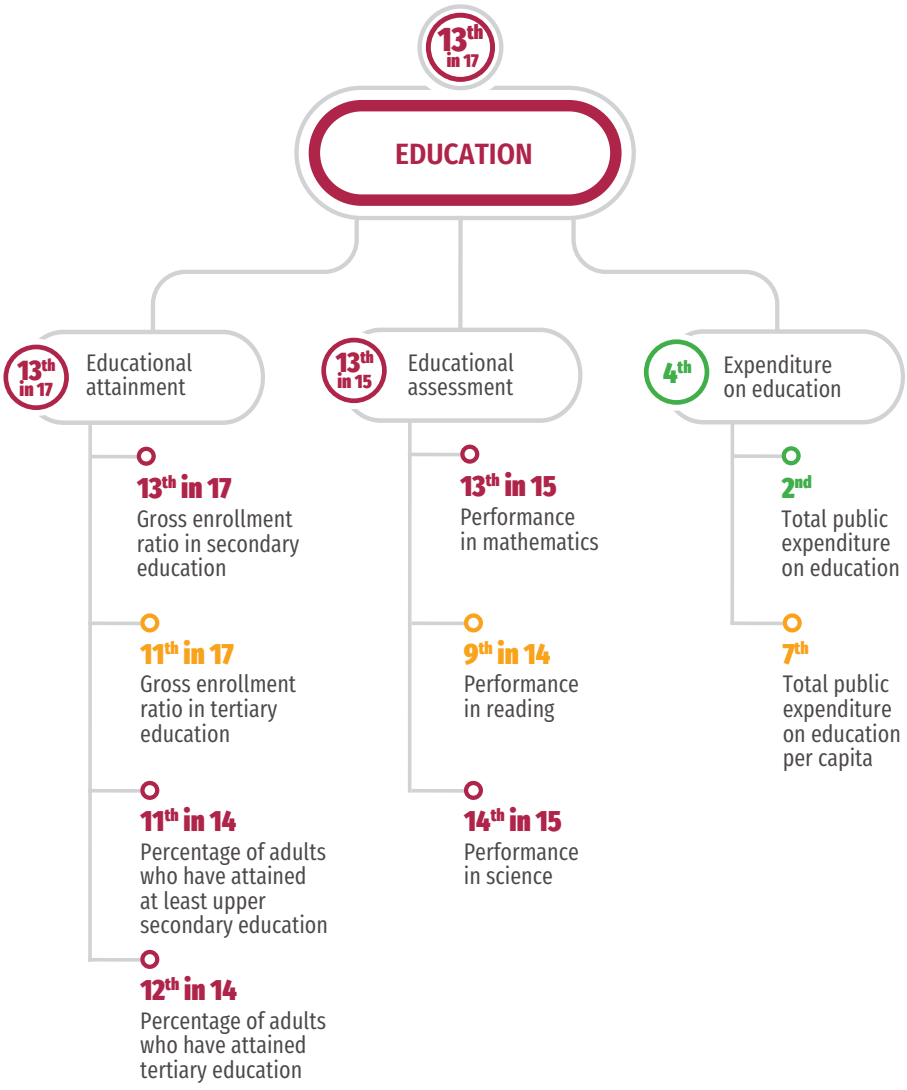
6 No information is available for China in connection with most of the variables evaluated. For this reason, China was excluded from the ranking of this factor.
7 The source of the data for South Africa is UNESCO.
8 No data is available for South Africa, China and India.

Only in the reading test Brazil is not in the bottom third of the ranking: it is the 9th best average among 14 countries assessed (Spain was not assessed in reading), according to the results of the last edition in 2018. Of the 15 countries assessed, Brazil is in third-to-last position in the math test and ranked second to last in the science test. The countries that occupied the three best positions in the three tests were the following ones: South Korea, Canada and Poland.

In comparison with the past ranking (revised 2018-2019 version), Brazil fell from 12th to 13th position in the Educational assessment subfactor – the only subfactor in which it recorded a change. Between the two editions of PISA, the scores of Brazilian students improved in the three tests[9]. Nevertheless, Brazil was surpassed by Peru in the average of the subfactor, losing one position. Like Brazil, Peru obtained higher scores in the three tests, rising from 14th to 12th position, surpassing Indonesia as well.

9 The comparisons of the averages between the 2015 and 2018 PISA editions are those that involve the lowest "margin of error" in math and science tests: 2.33 and 1.51 points, respectively. More information at OECD. Annex A7 Comparing reading, mathematics and science performance across PISA cycles. In: *PISA 2018 Results (Volume I): What Students Know and Can Do.* 2019.

FIGURE 17 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE EDUCATION FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



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)

2.9 TECHNOLOGY AND INNOVATION

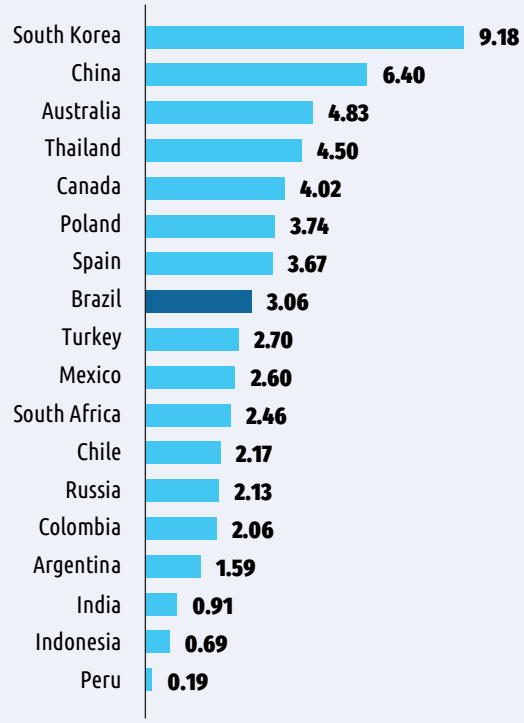
Share of companies in domestic investment in R&D needs to increase

In the Technology and innovation factor, Brazil is in the middle third of the ranking, in 8th position among the 18 countries evaluated – the best result achieved by the country among the nine factors that determine competitiveness. In both dimensions evaluated in connection with this factor – research and development (R&D) efforts and outcomes – Brazil is in the middle third of the ranking.

In R&D efforts, Brazil is among the first in the ranking of the variable Gross expenditure on R&D, which includes public and private spending. In 2017, the domestic volume of funds earmarked for R&D accounted for 1.26% of GDP – the fifth highest volume among all countries assessed. In South Korea and China – the best-ranked countries – the percentages were 4.55% and 2.13%, respectively.

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 (9th position). In 2016, the spending of Brazilian companies on R&D accounted for 45% of the total spending. In China and South Korea, corporate spending accounted for more than 70% of total expenditures.

FIGURE 18 - TECHNOLOGY AND INNOVATION FACTOR



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

In relation to the subfactor Outcomes of R&D efforts, performance is measured based on three variables: number of international patent applications, number of scientific and technical journal articles and importance of high-tech exports. Brazil showed its worse performance in the ranking of the variable PCT international applications: 13th position among 17 countries assessed[10].

In 2018, 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)[11]. Among the countries evaluated, the ones that filed the largest number of patent applications were the following: South Korea (8.0), China (2.1), Australia (1.4) and Canada (1.3).

In the other variables associated with this subfactor, Brazil is in the middle third of the ranking. In High-tech exports, which measures the share of exported high-tech products in total trade[12], it is in 7th position among 18 countries, and in Scientific and technical

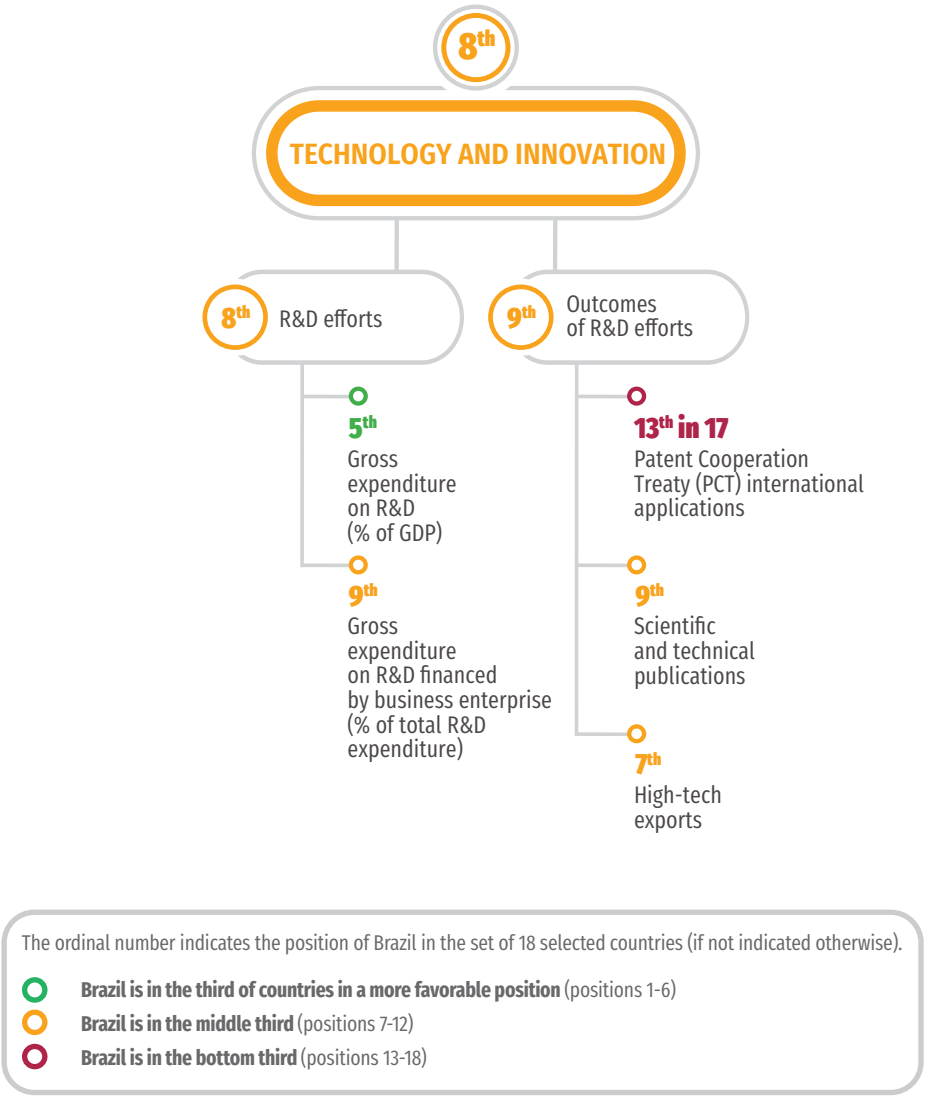
10 No data is available for Argentina.
11 The PCT makes it possible to apply for patent protection for an invention in many countries simultaneously by filing a single international patent application.
12 The "high tech exports" variable is an approximate measure for the outcomes of innovation activities of companies, complementing patent-related data referring to inventions.

publications, which measures the number of articles published in high-impact journals per billion GDP in PPP, it ranked 9th.

In relation to the previous ranking (revised 2018-2019 version), Brazil recorded a change only in the subfactor R&D efforts, falling from the upper third (6th position) to the middle third of the ranking (8th position). This result is due to a reduction in the indicator that measures the share of companies in total expenditure on R&D.

Between 2015 and 2016, the share of companies in total expenditure on R&D in Brazil decreased from 45.5% to 45.0%. Only Brazil and Canada recorded a reduction in this percentage. Poland recorded the sharpest increase: from 39% in 2015 to 53.1% in 2016. As a result, Brazil dropped four positions in the ranking of the variable, falling from the upper third (6th position) to the middle third (9th position). Despite this decline, Brazil remained in 8th position in the ranking of the Technology and innovation factor.

FIGURE 19 - BRAZIL'S POSITION IN THE RANKINGS RELATED TO THE TECHNOLOGY AND INNOVATION FACTOR AND ITS ASSOCIATED SUBFACTORS AND VARIABLES



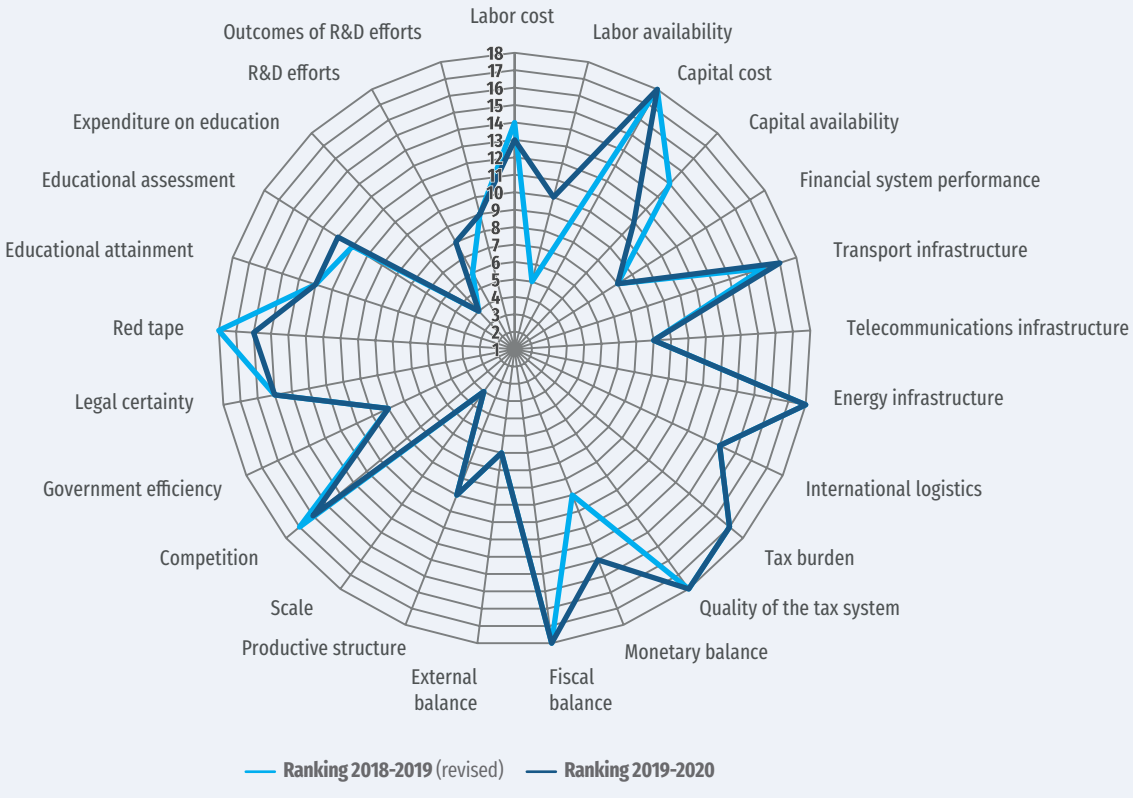
3 EVOLUTION OF COMPETITIVENESS FACTORS IN BRAZIL

COMPARISON OF POSITIONS IN THE RANKING

Figure 20 shows Brazil's positions in the rankings related to the 25 competitiveness subfactors. The farther from the center of the circumference, the worse the classification of the country in relation to that subfactor (positions 1-18). In the comparison between the 2018-2019 (revised version) and 2019-2020 rankings, a shift towards the center of the figure indicates a gain in positions, suggesting that the subfactor contributed to increasing the competitiveness of Brazilian companies.

Among the 25 subfactors, Brazil climbed positions in four cases, lost positions in five and remained in the same position in the remaining 16. The country remained in last position in four subfactors: Capital cost, Energy infrastructure, Quality of the tax system and Fiscal balance.

FIGURE 20 - EVOLUTION OF THE BRAZILIAN POSITION BETWEEN THE 2018-2019 (REVISED VERSION) AND 2019-2020 RANKINGS BY SUBFACTOR



SUBFACTOR IN WHICH BRAZIL CLIMBED POSITIONS:

- **Labor cost:** it moved up one position, due to a drop in the cost of hourly wages; despite this drop in the cost, it remained among the six worst-ranked countries, due to its second lowest labor productivity.

- **Capital availability:** it climbed three positions, reflecting an improvement in the availability of venture capital in the country according to the perception of entrepreneurs.

- **Competition:** it climbed one position due to the progress made in the qualitative variable Extent of market dominance, switching places with South Africa. The Brazilian indicator fell, but the South African one fell even further.

- **Red tape:** it moved up two positions due to a reduction in the time and cost of the red tape involved in starting a business and to improvements in the flexibility of labor relations, according to the perception of entrepreneurs.

SUBFACTORS IN WHICH BRAZIL LOST POSITIONS:

- **Labor availability:** it dropped five positions as a result of a drop in the growth rate of the Brazilian labor force.

- **Transport infrastructure:** : it lost one position due to declines in the quantitative variables Road connectivity index and Liner shipping connectivity and in the qualitative variable Efficiency of air transport services.

- **Monetary balance:** it fell four positions due to the acceleration of the inflation rate (consumer price index) from 3.4% in 2017 to 3.7% in 2018.

- **Educational assessment:** even though Brazil recorded a better performance in the comparison between the last two editions of PISA, it was surpassed by Peru in the average of the subfactor, as it had a better performance than Brazil.

- **R&D efforts:** it dropped two positions, reflecting the drop in the indicator measuring the share of companies in domestic expenditure on R&D.

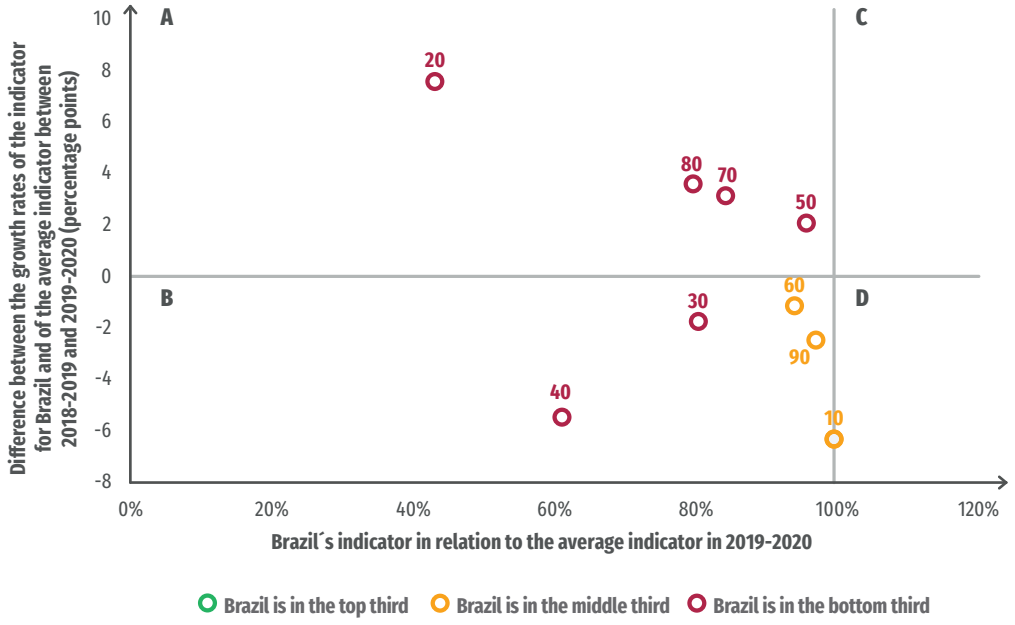
COMPARISON BETWEEN THE VALUES OF THE INDICATORS

The following graphs are based not on positions, but rather on the values of the indicators associated with the 9 factors (Figure 21) and the 25 subfactors (Figure 22). For each of these factors or subfactors, the values obtained for Brazil are compared to the average of the 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 2018-2019 (revised version) and 2019-2020 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 21 - COMPARISON BETWEEN THE BRAZILIAN PERFORMANCE AND THE AVERAGE PERFORMANCE OF THE 18 COUNTRIES BY FACTOR



QUADRANTS	
A - Brazil is regaining competitiveness	60 Productive structure, scale and competition
20 Financing	90 Technology and innovation
50 Macroeconomic environment	**C - Brazil has become more competitive**
70 Business environment	
80 Education	
B - Brazil´s low competitiveness worsens	**D - Brazil´s competitiveness is threatened**
10 Labor	
30 Infrastructure and logistics	
40 Taxation	

In the six factors in which Brazil is in the bottom third of the ranking (red third), the value of the Brazilian indicator is lower than the average indicator. However, in four of them — **Financing, Macroeconomic environment, Business environment and Education** — Brazil is recovering its competitiveness (**quadrant A**). This quadrant comprises factors in which Brazil recorded a lower indicator than the average, but its performance — as measured in terms of the growth rate of the indicator between the 2018-2019 (revised version) and 2019-2020 rankings — is higher than the average performance.

In the other two factors — **Infrastructure and logistics and Taxation** — Brazil is in **quadrant B**. In this case, the country's low competitiveness is worsening. That is, in addition to the fact that the Brazilian indicator is below average, its growth rate is lower than the average rate of the indicators of the selected countries. The factors **Labor, Productive structure, scale and competition and Technology and innovation**, in which Brazil is in the middle third of the ranking, are also included in **quadrant B**.

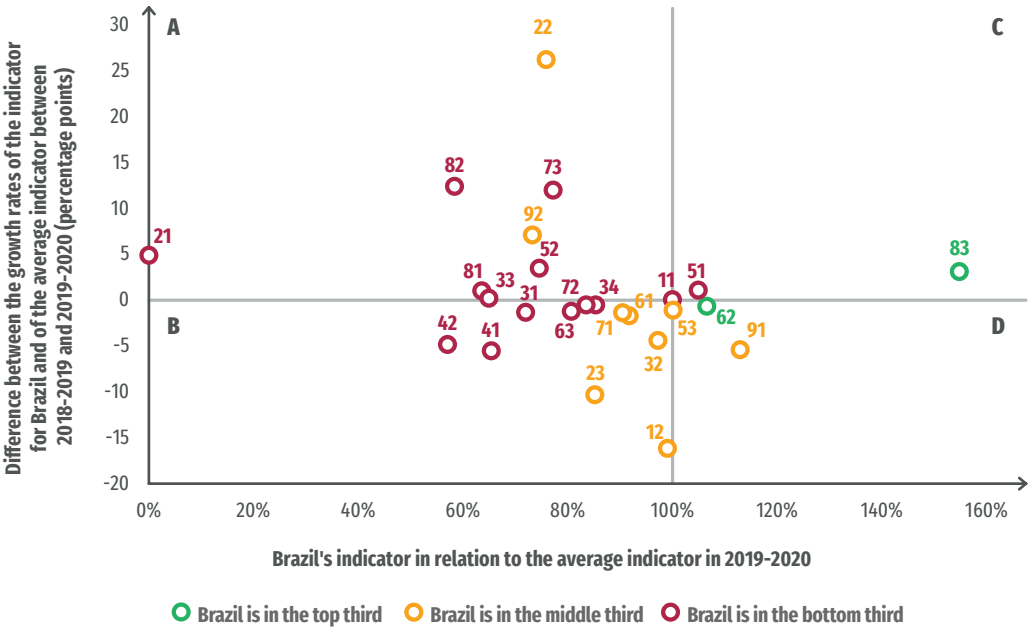
Among the factors included in **quadrant A**, in which Brazil's performance exceeded the average performance, it is worth noting that Brazil climbed one position in the ranking in Business environment.

In the other cases, although Brazil has improved in relation to the average, it did not climb positions in the ranking. Among the factors included in **quadrant B**, Brazil lost position in the Labor factor. In the other factors, despite showing a growth rate below the average rate, the country remained in the same positions.

Finally, it is worth mentioning that Brazil does not have any factors classified in **quadrant C** and **quadrant D**. The former brings together cases in which Brazil would not only be more competitive than the average but would also show a growth rate above the average rate. In the latter, Brazil would be more competitive than the average of its competitors, but its indicators would show a growth rate below the average growth during the period considered.

Figure 22 shows the same exercise for the 25 subfactors. Most of them (76%) are classified in **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 over half of the factors (58%), the situation of lack of competitiveness in Brazil is worsening, since the growth rate of the Brazilian indicator was lower than the average rate during the period (**quadrant B**). For the remaining factors (42%), Brazil is reducing its competitiveness gap, that is, the Brazilian indicator grew more (or declined less) than the average indicator over the period (**quadrant A**).

FIGURE 22 - COMPARISON BETWEEN THE BRAZILIAN PERFORMANCE AND THE AVERAGE PERFORMANCE OF THE 18 COUNTRIES BY SUBFACTOR



QUADRANTS

A - Brazil is regaining competitiveness

21 Capital cost
22 Capital availability
33 Energy infrastructure
52 Fiscal balance
73 Red tape
81 Educational attainment
82 Educational assessment
92 Outcomes of R&D efforts

B - Brazil´s low competitiveness worsens

12 Labor availability
23 Financial system performance
31 Transport infrastructure
32 Telecommunications infrastructure
34 International logistics
41 Tax burden
42 Labor cost
61 Productive structure
63 Competition
71 Government efficiency
72 Legal certainty

C - Brazil has become more competitive

11 Labor cost
51 Monetary balance
83 Expenditure on education

D - Brazil´s competitiveness is threatened

53 External balance
62 Scale
91 R&D efforts

Brazil is more competitive than the average of its competitors in six subfactors, which can be seen in **quadrants C and D**. In half of them – Labor costs, Monetary balance and Expenditure on education – the Brazilian indicator evolved better than the average indicator (**quadrant C**).

In the other half – External balance, Scale and R&D efforts – Brazil's competitiveness is at risk (**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.

Between 2017 and 2018, the current account deficit recorded by the Brazilian foreign trade sector doubled (from -0.4% to -0.8% of GDP), while the deficit recorded by the average of the countries increased by 41%. Over the same period, the Brazilian domestic market grew by 3.9%, while those of the average of the countries increased by 7.4%. Finally, the country's R&D efforts decreased (the Brazilian score declined by 2%), while in the average of the countries they increased (the average score rose by 3%).

4 COMPETITIVENESS FACTORS OF THE SELECTED COUNTRIES

The graphs and tables in this section show the performance of each of the 17 selected countries. The first table shows some structural indicators of the country, such as its area, population, GDP and GDP per capita, which are also relevant for understanding its performance.

The second table shows the results achieved by the country selected in this edition (the score, ranging from 0 to 10, and position in the ranking, ranging from 1 to 18), considering the nine factors that determine competitiveness and their subfactors. For comparison purposes, the table also shows the results for the best-performing country and the results for Brazil.

The spider web graph compares the selected country with Brazil in connection with a given competitiveness factor. The further away from the center of the circumference, the better the country's performance in that competitiveness factor (the higher the score on a 0-10 scale). The distance between the two points within the same radius is the performance differential between the selected country and Brazil.

Finally, the bar chart shows the scores achieved by the selected country (on a 0-10 scale) in each of the nine factors that determine competitiveness. The color of the bar indicates whether the selected country is in the upper, middle or bottom third of the ranking among the 18 countries. The overall average is the simple average between the values in the nine factors.

4.1 SOUTH AFRICA

South Africa ranks 10th in the 2019-2020 ranking of the Brazil Competitiveness Report. Of the nine factors determining competitiveness, the country is in the middle third (positions 7-12) in six of them and in the bottom third (among the six worst-ranked countries) in the remaining three. Brazil is ahead of South Africa in two factors: Productive structure, scale and competition and Technology and innovation. In relation to the 2018-2019 ranking (revised version), it climbed positions in the Labor factor (from 14th to 7th) due to the faster growth rate of its labor force and lost positions in Financing, Taxation, Business environment, Education and Technology and innovation. Despite these changes, it remained in 10th place in the overall ranking.

TABLE 1 - SOUTH AFRICA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	1,219
Population (millions)	58
GDP (billion USD)	368
GDP per capita, PPP (thousand USD)	13
Agricultural products exports (billion USD)	14
Total exports (billion USD)	93
Total imports (billion USD)	113

FIGURE 23 - BRAZIL-SOUTH AFRICA COMPARISON

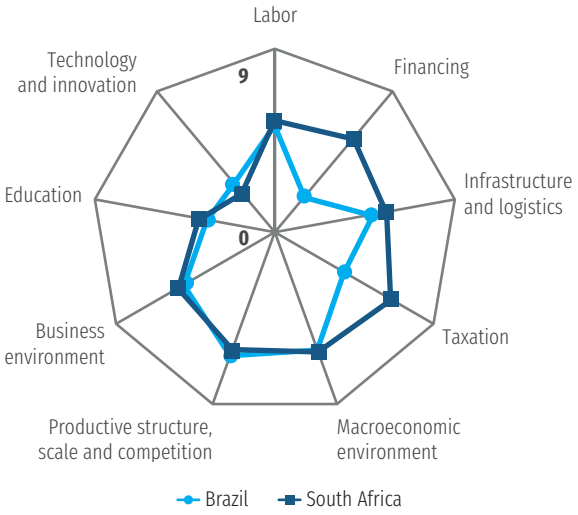


FIGURE 24 - SOUTH AFRICA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

Overall average: 5.2

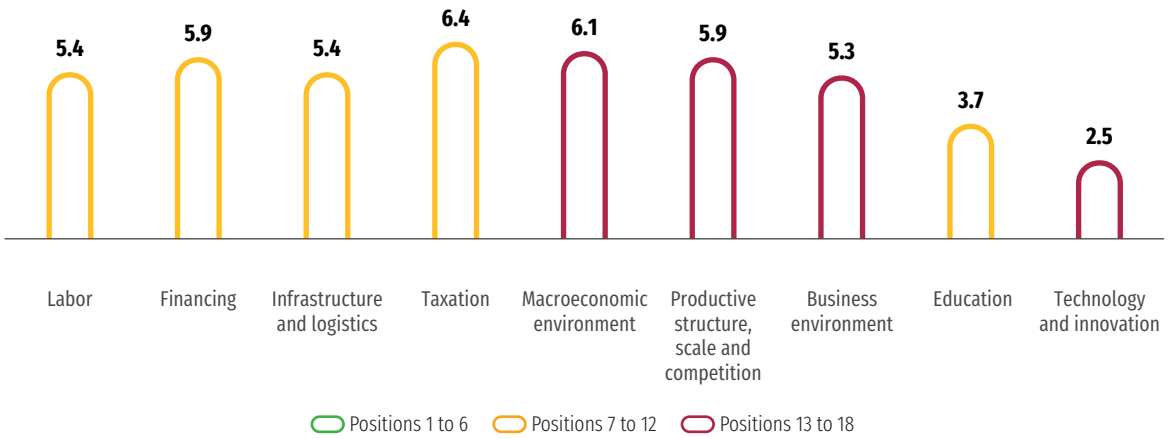


TABLE 2 - SOUTH AFRICA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

SOUTH AFRICA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.40**	**7**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.30	9	Turkey	5.77	5.10	13
Labor availability	5.50	8	Peru	7.12	5.22	10
Financing	**5.88**	**8**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	7.40	10	Spain	9.28	0.00	18
Capital availability	6.78	1	South Africa	6.78	2.92	11
Financial system performance	3.46	11	China	8.06	3.75	8
Infrastructure and logistics	**5.45**	**12**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.37	10	South Korea	7.49	3.88	17
Telecommunications infrastructure	4.45	15	South Korea	9.60	6.02	9
Energy infrastructure	5.88	5	Canada	6.12	3.43	18
International logistics	6.08	12	Spain	9.18	5.74	14
Taxation	**6.42**	**10**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.21	9	Indonesia	8.37	3.90	17
Quality of the tax system	6.63	10	Australia	8.22	3.75	18
Macroeconomic environment	**6.05**	**15**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	8.59	15	Thailand	9.62	8.87	14
Fiscal balance	4.56	13	Russia	5.85	3.66	18
External balance	5.01	16	Russia	6.31	5.35	7
Productive structure, scale and competition	**5.93**	**14**	**China**	**8.01**	**6.25**	**12**
Productive structure	4.71	14	South Korea	9.47	5.38	10
Scale	6.93	15	China	9.92	8.20	4
Competition	6.16	12	Poland	8.42	5.18	16
Business environment	**5.33**	**14**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	5.12	10	Australia	9.46	5.19	9
Legal certainty	5.91	8	Australia	8.24	5.05	15
Red tape	4.95	15	Canada	8.36	4.81	16
Education	**3.71**	**10**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	3.53	12	Australia	8.24	3.30	13
Educational assessment	0.00	0	South Korea	8.35	3.01	13
Expenditure on education	3.88	3	Australia	4.90	3.64	4
Technology and innovation	**2.46**	**11**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	3.40	10	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.52	11	South Korea	8.56	1.87	9

4.2 ARGENTINA

Argentina has the worst performance in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, Argentina is in the bottom third (among the six worst-ranked countries) in six of them. The country is not included the upper third of the ranking in any of them. The best result it achieved is in the Education factor, in which it is in the middle third, in 8th position among 17 countries. In two factors, Argentina ranked last, namely: Taxation and Macroeconomic environment. As compared to the 2018-2019 ranking (revised version), Argentina became even less competitive: the country fell one position in the factors Labor and Business environment, remaining in the same position in the other factors.

TABLE 3 - ARGENTINA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	2,780
Population (millions)	44
GDP (billion USD)	519
GDP per capita, PPP (thousand USD)	20
Agricultural products exports (billion USD)	34
Total exports (billion USD)	61
Total imports (billion USD)	65

FIGURE 25 - BRAZIL-ARGENTINA COMPARISON

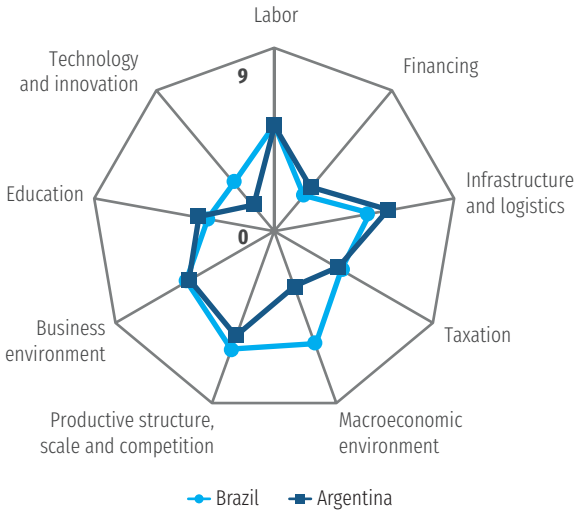


FIGURE 26 - ARGENTINA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

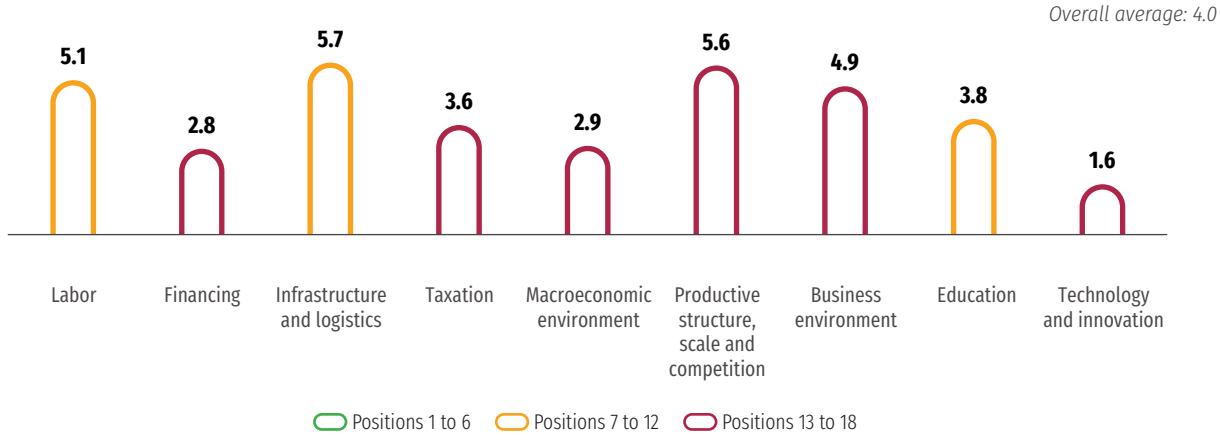


TABLE 4 - ARGENTINA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

ARGENTINA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.12**	**11**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.25	10	Turkey	5.77	5.10	13
Labor availability	4.99	12	Peru	7.12	5.22	10
Financing	**2.76**	**17**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	6.04	15	Spain	9.28	0.00	18
Capital availability	0.89	18	South Africa	6.78	2.92	11
Financial system performance	1.34	17	China	8.06	3.75	8
Infrastructure and logistics	**5.68**	**11**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	4.47	15	South Korea	7.49	3.88	17
Telecommunications infrastructure	6.88	8	South Korea	9.60	6.02	9
Energy infrastructure	6.00	3	Canada	6.12	3.43	18
International logistics	5.38	15	Spain	9.18	5.74	14
Taxation	**3.64**	**18**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	2.06	18	Indonesia	8.37	3.90	17
Quality of the tax system	5.23	16	Australia	8.22	3.75	18
Macroeconomic environment	**2.94**	**18**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	0.00	18	Thailand	9.62	8.87	14
Fiscal balance	4.03	16	Russia	5.85	3.66	18
External balance	4.79	18	Russia	6.31	5.35	7
Productive structure, scale and competition	**5.56**	**17**	**China**	**8.01**	**6.25**	**12**
Productive structure	4.47	16	South Korea	9.47	5.38	10
Scale	7.12	14	China	9.92	8.20	4
Competition	5.10	17	Poland	8.42	5.18	16
Business environment	**4.86**	**17**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	5.47	8	Australia	9.46	5.19	9
Legal certainty	4.88	16	Australia	8.24	5.05	15
Red tape	4.22	18	Canada	8.36	4.81	16
Education	**3.78**	**8**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	5.81	7	Australia	8.24	3.30	13
Educational assessment	2.78	14	South Korea	8.35	3.01	13
Expenditure on education	2.74	6	Australia	4.90	3.64	4
Technology and innovation	**1.59**	**15**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	1.74	15	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.45	12	South Korea	8.56	1.87	9

4.3 AUSTRALIA

Australia is the third economy with the best performance in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, Australia is in the upper third (among the six best-ranked countries) in five. Australia ranked first in the Education factor – the best result achieved by the country. In this factor, the gap between Brazil and Australia is as wide as 12 positions. In the Labor factor, Australia had its worst result, standing in 14th position among the 18 countries. Compared to the 2018-2019 ranking (revised version), Australia recorded a change only in the Labor factor. Due to the slower growth rate of its labor force, it fell from 11th to 14th position, dropping from the middle third to the bottom third of the ranking.

TABLE 5 - AUSTRALIA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	7,741
Population (millions)	25
GDP (billion USD)	1,420
GDP per capita, PPP (thousand USD)	52
Agricultural products exports (billion USD)	36
Total exports (billion USD)	257
Total imports (billion USD)	235

FIGURE 27 - BRAZIL-AUSTRALIA COMPARISON

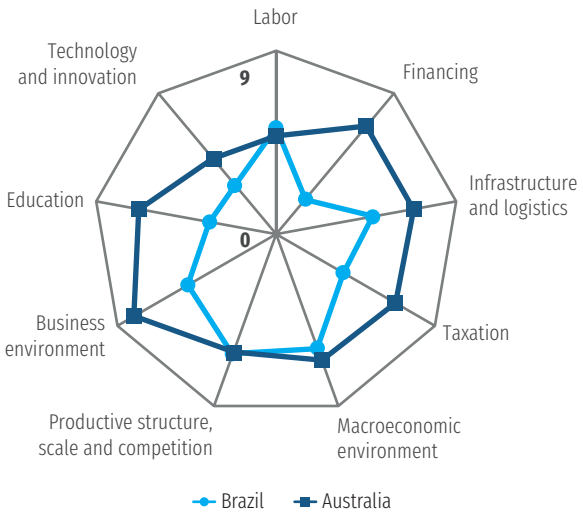


FIGURE 28 - AUSTRALIA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

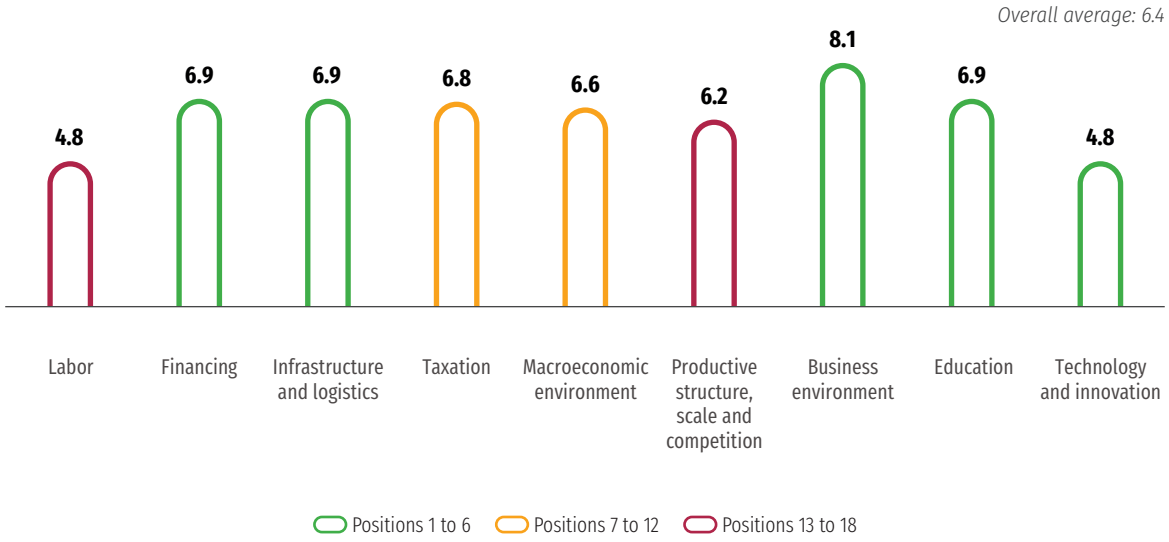


TABLE 6 - AUSTRALIA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

AUSTRALIA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.81**	**14**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	3.88	18	Turkey	5.77	5.10	13
Labor availability	5.75	5	Peru	7.12	5.22	10
Financing	**6.86**	**4**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	8.34	4	Spain	9.28	0.00	18
Capital availability	5.05	5	South Africa	6.78	2.92	11
Financial system performance	7.20	3	China	8.06	3.75	8
Infrastructure and logistics	**6.85**	**4**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.83	5	South Korea	7.49	3.88	17
Telecommunications infrastructure	8.48	2	South Korea	9.60	6.02	9
Energy infrastructure	5.64	7	Canada	6.12	3.43	18
International logistics	7.46	6	Spain	9.18	5.74	14
Taxation	**6.80**	**7**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	5.39	13	Indonesia	8.37	3.90	17
Quality of the tax system	8.22	1	Australia	8.22	3.75	18
Macroeconomic environment	**6.60**	**8**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.37	6	Thailand	9.62	8.87	14
Fiscal balance	5.24	8	Russia	5.85	3.66	18
External balance	5.19	10	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.20**	**13**	**China**	**8.01**	**6.25**	**12**
Productive structure	3.46	17	South Korea	9.47	5.38	10
Scale	7.34	11	China	9.92	8.20	4
Competition	7.79	4	Poland	8.42	5.18	16
Business environment	**8.09**	**2**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	9.46	1	Australia	9.46	5.19	9
Legal certainty	8.24	1	Australia	8.24	5.05	15
Red tape	6.58	8	Canada	8.36	4.81	16
Education	**6.86**	**1**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	8.24	1	Australia	8.24	3.30	13
Educational assessment	7.45	4	South Korea	8.35	3.01	13
Expenditure on education	4.90	1	Australia	4.90	3.64	4
Technology and innovation	**4.83**	**3**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	6.06	3	South Korea	9.80	4.25	8
Outcomes of R&D efforts	3.61	4	South Korea	8.56	1.87	9

4.4 CANADA

Canada is the second economy with the best result in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, Canada is in the upper third (among the six best-ranked countries) in six of them. In the Financing and Business Environment factors, it ranked first. The biggest gap between Brazil and Canada is in the Financing factor: while Canada was ranked first, Brazil ranked last. In the Labor and Macroeconomic environment factors, Canada had its worst performance: in both of them, it ranked 13th among 18 countries. Compared to the 2018-2019 ranking (revised version), the acceleration of inflation and the progress made by Turkey led Canada to lose two positions in the Taxation factor. Despite this loss, it remained in second position in the overall ranking.

TABLE 7 - CANADA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	9,984
Population (millions)	36
GDP (billion USD)	1,712
GDP per capita, PPP (thousand USD)	49
Agricultural products exports (billion USD)	69
Total exports (billion USD)	450
Total imports (billion USD)	470

FIGURE 29 - BRAZIL-CANADA COMPARISON

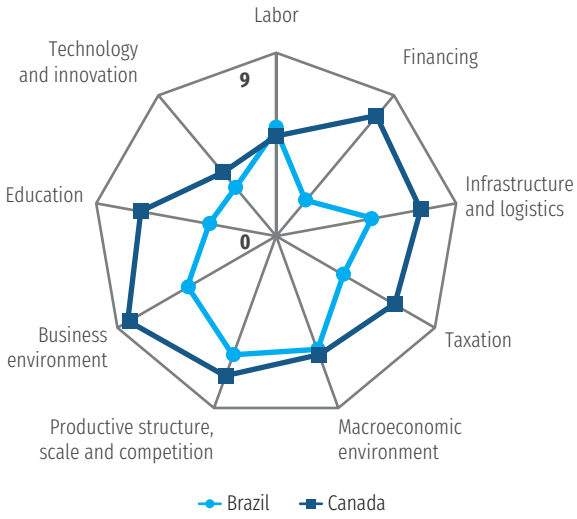


FIGURE 30 - CANADA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

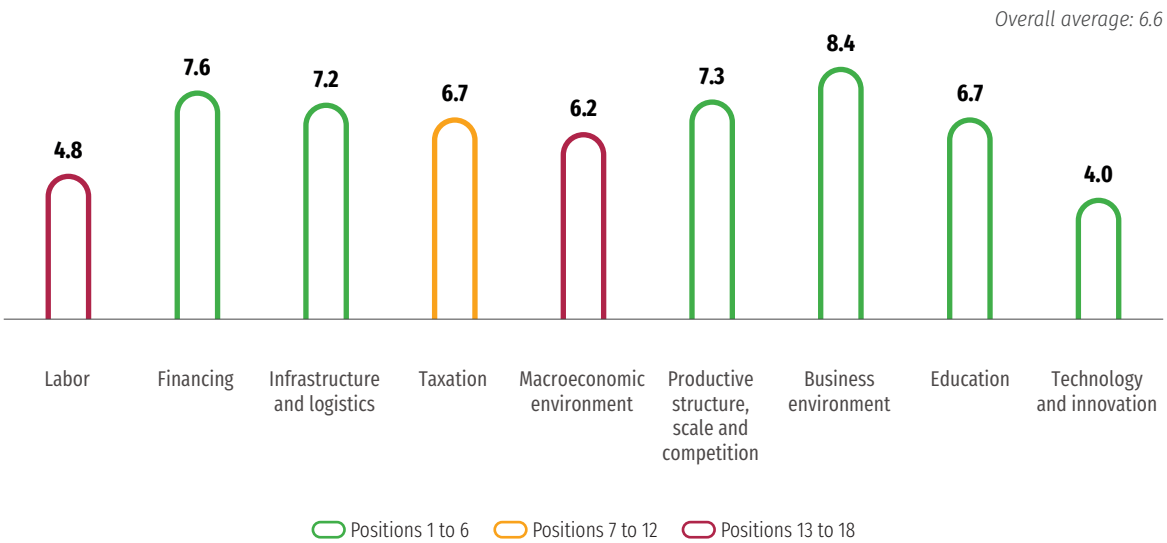


TABLE 8 - CANADA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

CANADA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.85**	**13**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	4.45	15	Turkey	5.77	5.10	13
Labor availability	5.25	9	Peru	7.12	5.22	10
Financing	**7.65**	**1**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	8.70	3	Spain	9.28	0.00	18
Capital availability	6.60	2	South Africa	6.78	2.92	11
Financial system performance	0.00	0	China	8.06	3.75	8
Infrastructure and logistics	**7.19**	**3**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	6.10	4	South Korea	7.49	3.88	17
Telecommunications infrastructure	8.20	4	South Korea	9.60	6.02	9
Energy infrastructure	6.12	1	Canada	6.12	3.43	18
International logistics	8.35	3	Spain	9.18	5.74	14
Taxation	**6.72**	**8**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	5.97	12	Indonesia	8.37	3.90	17
Quality of the tax system	7.47	6	Australia	8.22	3.75	18
Macroeconomic environment	**6.23**	**13**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.28	8	Thailand	9.62	8.87	14
Fiscal balance	4.29	14	Russia	5.85	3.66	18
External balance	5.12	12	Russia	6.31	5.35	7
Productive structure, scale and competition	**7.34**	**5**	**China**	**8.01**	**6.25**	**12**
Productive structure	6.39	7	South Korea	9.47	5.38	10
Scale	7.66	10	China	9.92	8.20	4
Competition	7.97	3	Poland	8.42	5.18	16
Business environment	**8.40**	**1**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	9.22	2	Australia	9.46	5.19	9
Legal certainty	7.61	3	Australia	8.24	5.05	15
Red tape	8.36	1	Canada	8.36	4.81	16
Education	**6.73**	**2**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	7.81	3	Australia	8.24	3.30	13
Educational assessment	8.24	2	South Korea	8.35	3.01	13
Expenditure on education	4.14	2	Australia	4.90	3.64	4
Technology and innovation	**4.02**	**5**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	4.42	6	South Korea	9.80	4.25	8
Outcomes of R&D efforts	3.61	3	South Korea	8.56	1.87	9

4.5 CHILE

Chile occupies the eighth position in the ranking of the Brazil Competitiveness Report 2019-2020. It is the best-ranked Latin American country – Mexico is second, in 12th position. Among the nine factors determining competitiveness, Chile is in the upper third (among the six best-ranked countries) in four of them. In the Taxation factor, Chile is in second position – its best result. The biggest gap between Brazil and Chile is also in the Taxation factor: difference of 15 positions. The worst result recorded for Chile is in the Productive structure, scale and competition factor, in which it is in the bottom third of the ranking, in 16th position. In comparison with the 2018-2019 ranking (revised version), it moved up one position in the Technology and innovation factor (from 13th to 12th position), surpassing Russia.

TABLE 9 - CHILE:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	756
Population (millions)	18
GDP (billion USD)	298
GDP per capita, PPP (thousand USD)	25
Agricultural products exports (billion USD)	24
Total exports (billion USD)	75
Total imports (billion USD)	75

FIGURE 31 - BRAZIL-CHILE COMPARISON

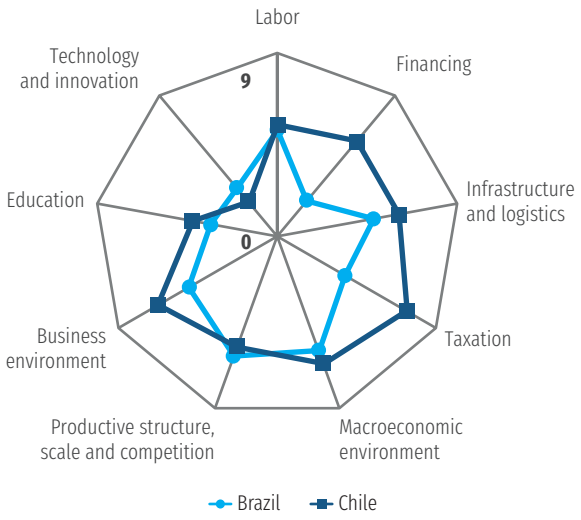


FIGURE 32 - CHILE'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

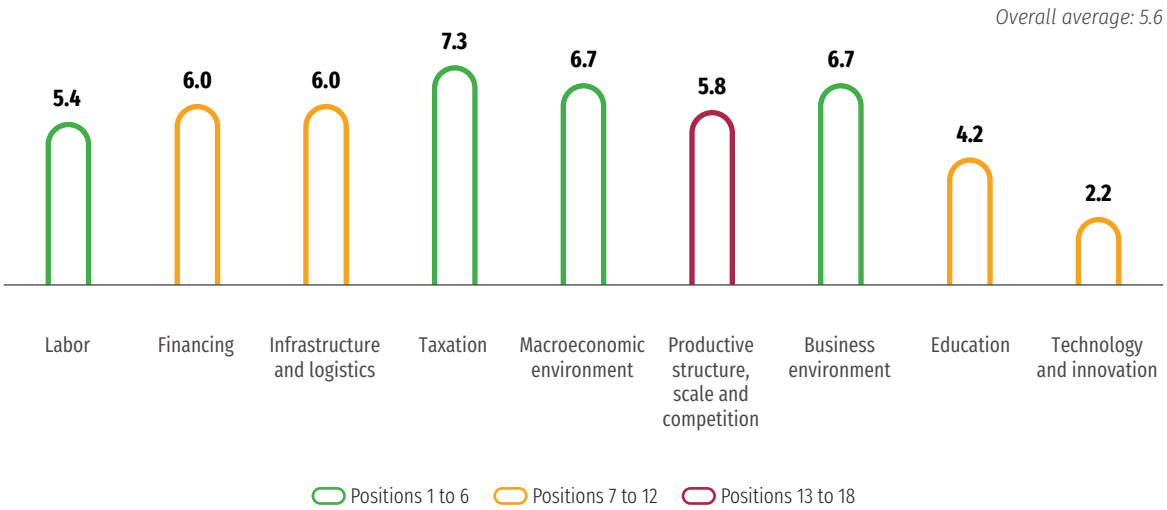


TABLE 10 - CHILE:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

CHILE			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.42**	**6**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.34	8	Turkey	5.77	5.10	13
Labor availability	5.51	7	Peru	7.12	5.22	10
Financing	**6.04**	**7**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	8.33	5	Spain	9.28	0.00	18
Capital availability	4.78	7	South Africa	6.78	2.92	11
Financial system performance	5.01	6	China	8.06	3.75	8
Infrastructure and logistics	**6.02**	**7**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.55	7	South Korea	7.49	3.88	17
Telecommunications infrastructure	7.13	6	South Korea	9.60	6.02	9
Energy infrastructure	4.37	16	Canada	6.12	3.43	18
International logistics	7.03	9	Spain	9.18	5.74	14
Taxation	**7.30**	**2**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	7.06	4	Indonesia	8.37	3.90	17
Quality of the tax system	7.55	4	Australia	8.22	3.75	18
Macroeconomic environment	**6.66**	**5**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.26	9	Thailand	9.62	8.87	14
Fiscal balance	5.64	2	Russia	5.85	3.66	18
External balance	5.06	14	Russia	6.31	5.35	7
Productive structure, scale and competition	**5.79**	**16**	**China**	**8.01**	**6.25**	**12**
Productive structure	4.58	15	South Korea	9.47	5.38	10
Scale	6.46	17	China	9.92	8.20	4
Competition	6.32	9	Poland	8.42	5.18	16
Business environment	**6.75**	**4**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	7.40	3	Australia	9.46	5.19	9
Legal certainty	6.97	4	Australia	8.24	5.05	15
Red tape	5.87	11	Canada	8.36	4.81	16
Education	**4.20**	**7**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	5.31	9	Australia	8.24	3.30	13
Educational assessment	4.72	8	South Korea	8.35	3.01	13
Expenditure on education	2.57	7	Australia	4.90	3.64	4
Technology and innovation	**2.17**	**12**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	2.68	13	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.66	10	South Korea	8.56	1.87	9

4.6 CHINA

China is the fourth economy with the best performance in the ranking of the Brazil Competitiveness Report 2019-2020. It is in the upper third of the ranking (among the six best-ranked countries) in five out of eight factors determining competitiveness*. China has the largest domestic market among the 18 countries and its productive structure is the second most capable of producing a greater diversity of goods. These results place China in first position in the Productive structure, scale and competition factor. Brazil is ahead of China only in the Labor factor and the gap between them is only of one position. The biggest gap between the two countries is in the Financing factor, in which China is in second position, while Brazil ranked last. China's worst position is in the Taxation factor, in which it is in the middle third of the ranking, in 11th position. Compared to the 2018-2019 ranking (revised version), China did not make any progress in any of the factors. It lost positions in the Labor, Taxation and Macroeconomic environment factors, but remained in fourth position in the overall ranking.

TABLE 11 - CHINA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	9.562
Population (millions)	1.395
GDP (billion USD)	13.368
GDP per capita, PPP (thousand USD)	18
Agricultural products exports (billion USD)	82
Total exports (billion USD)	2.486
Total imports (billion USD)	2.135

FIGURE 33 - BRAZIL-CHINA COMPARISON

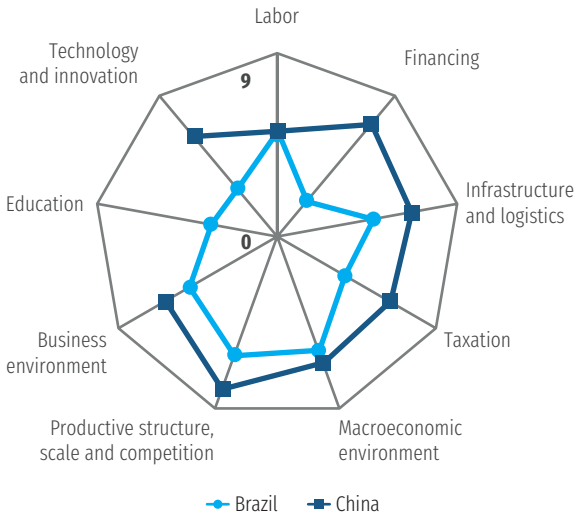
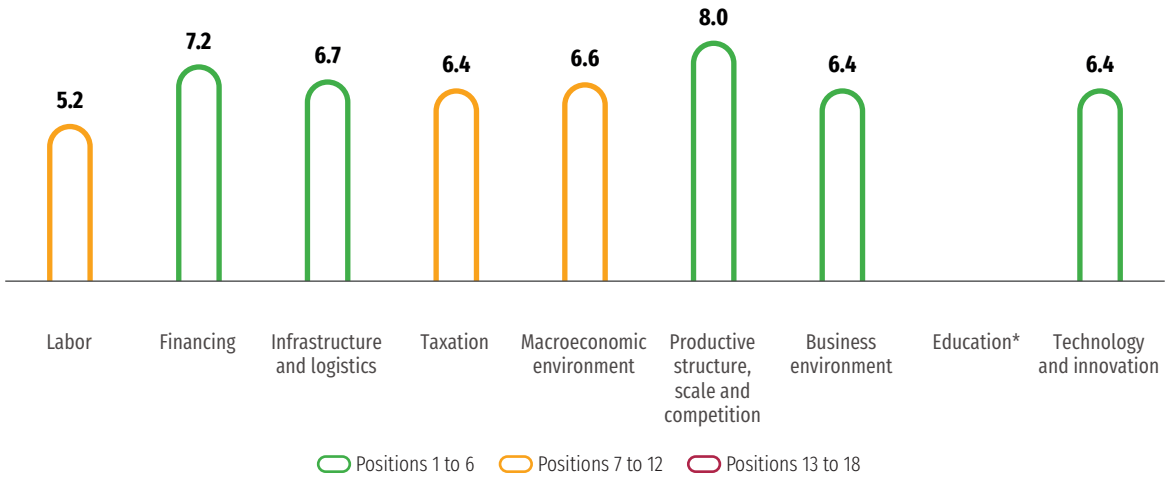


FIGURE 34 - CHINA'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)v



*No data is available for the Education factor for China.
**In determining the general ranking, 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. For additional details, see the methodological note in appendix Appendix A, under "Aggregation of variables into subfactors and factors".

TABLE 12 - CHINA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

CHINA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.15**	**10**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.20	11	Turkey	5.77	5.10	13
Labor availability	5.11	11	Peru	7.12	5.22	10
Financing	**7.16**	**2**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	7.89	7	Spain	9.28	0.00	18
Capital availability	5.53	4	South Africa	6.78	2.92	11
Financial system performance	8.06	1	China	8.06	3.75	8
Infrastructure and logistics	**6.67**	**6**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	6.71	3	South Korea	7.49	3.88	17
Telecommunications infrastructure	5.97	10	South Korea	9.60	6.02	9
Energy infrastructure	6.01	2	Canada	6.12	3.43	18
International logistics	7.98	5	Spain	9.18	5.74	14
Taxation	**6.40**	**11**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.12	10	Indonesia	8.37	3.90	17
Quality of the tax system	6.67	9	Australia	8.22	3.75	18
Macroeconomic environment	**6.62**	**7**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.32	7	Thailand	9.62	8.87	14
Fiscal balance	5.02	10	Russia	5.85	3.66	18
External balance	5.50	5	Russia	6.31	5.35	7
Productive structure, scale and competition	**8.01**	**1**	**China**	**8.01**	**6.25**	**12**
Productive structure	7.77	2	South Korea	9.47	5.38	10
Scale	9.92	1	China	9.92	8.20	4
Competition	6.36	8	Poland	8.42	5.18	16
Business environment	**6.38**	**6**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.38	15	Australia	9.46	5.19	9
Legal certainty	6.92	5	Australia	8.24	5.05	15
Red tape	7.85	2	Canada	8.36	4.81	16
Education	**-**	**-**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	-	-	Australia	8.24	3.30	13
Educational assessment	-	-	South Korea	8.35	3.01	13
Expenditure on education	1.45	14	Australia	4.90	3.64	4
Technology and innovation	**6.40**	**2**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	7.19	2	South Korea	9.80	4.25	8
Outcomes of R&D efforts	5.61	2	South Korea	8.56	1.87	9

4.7 COLOMBIA

Colombia is the fourth economy with the worst performance in the ranking of the Brazil Competitiveness Report 2019-2020 – ahead of Peru, Brazil and Argentina. Among the nine factors determining competitiveness, the only two in which it is not in the bottom third (among the six worst-ranked countries) of the ranking are the Labor and Macroeconomic environment factors. In the Labor factor, it is the second best-ranked economy, mainly due to its availability of labor. The worst result achieved by the country is in the Infrastructure and logistics factor, in which it ranked third to last. Colombia is ahead of Brazil in five factors, and the largest gap between them is in the Labor factor (seven positions). Compared to the 2018-2019 ranking (revised version), Colombia climbed one position in five factors, lost one position in one and remained in the same position in the remaining three. Its performance in the Macroeconomic environment factor stands out, in which it moved up from the bottom third (13th position) to the middle third (12th position) in the ranking due to improvements in inflation control.

TABLE 13 - COLOMBIA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	1,141
Population (millions)	49
GDP (billion USD)	330
GDP per capita, PPP (thousand USD)	14
Agricultural products exports (billion USD)	7
Total exports (billion USD)	41
Total imports (billion USD)	51

FIGURE 35 - BRAZIL-COLOMBIA COMPARISON

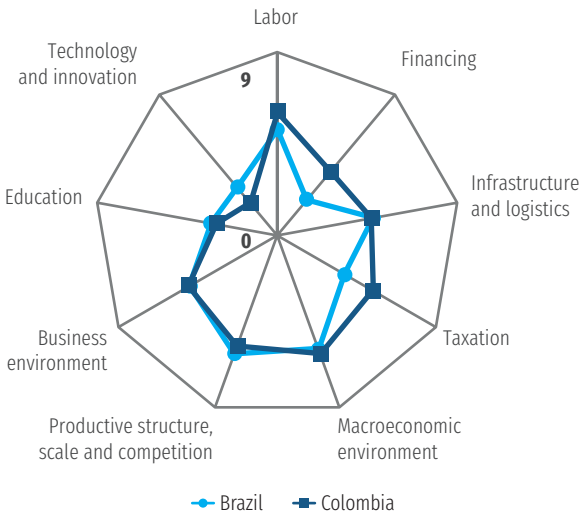


FIGURE 36 - COLOMBIA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

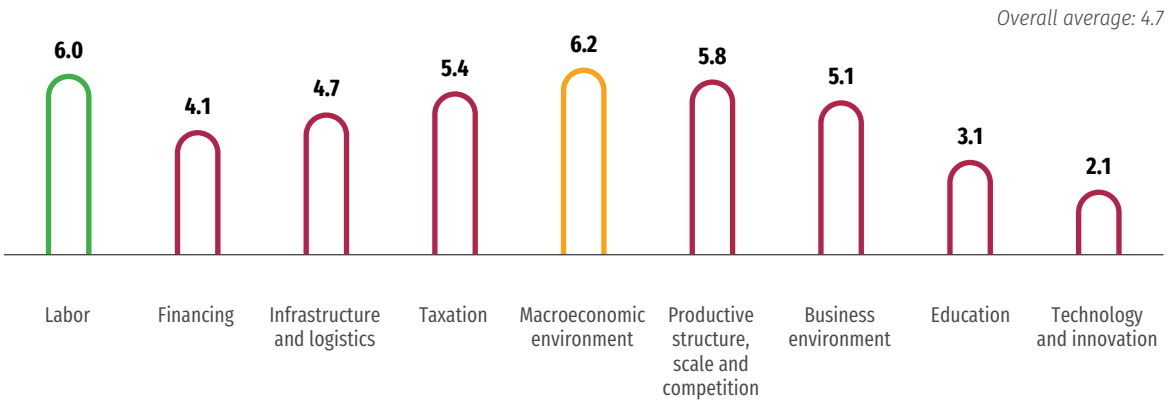


TABLE 14 - COLOMBIA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

COLOMBIA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**6.00**	**2**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.34	7	Turkey	5.77	5.10	13
Labor availability	6.66	2	Peru	7.12	5.22	10
Financing	**4.06**	**13**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	6.30	14	Spain	9.28	0.00	18
Capital availability	2.49	13	South Africa	6.78	2.92	11
Financial system performance	3.39	13	China	8.06	3.75	8
Infrastructure and logistics	**4.67**	**17**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	3.89	16	South Korea	7.49	3.88	17
Telecommunications infrastructure	5.03	13	South Korea	9.60	6.02	9
Energy infrastructure	4.50	15	Canada	6.12	3.43	18
International logistics	5.27	17	Spain	9.18	5.74	14
Taxation	**5.43**	**16**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	5.34	14	Indonesia	8.37	3.90	17
Quality of the tax system	5.52	15	Australia	8.22	3.75	18
Macroeconomic environment	**6.24**	**12**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	8.99	12	Thailand	9.62	8.87	14
Fiscal balance	4.77	12	Russia	5.85	3.66	18
External balance	4.95	17	Russia	6.31	5.35	7
Productive structure, scale and competition	**5.85**	**15**	**China**	**8.01**	**6.25**	**12**
Productive structure	4.79	12	South Korea	9.47	5.38	10
Scale	6.92	16	China	9.92	8.20	4
Competition	5.84	14	Poland	8.42	5.18	16
Business environment	**5.08**	**15**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	5.54	7	Australia	9.46	5.19	9
Legal certainty	3.93	18	Australia	8.24	5.05	15
Red tape	5.76	13	Canada	8.36	4.81	16
Education	**3.06**	**14**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	3.99	11	Australia	8.24	3.30	13
Educational assessment	3.26	11	South Korea	8.35	3.01	13
Expenditure on education	1.93	12	Australia	4.90	3.64	4
Technology and innovation	**2.06**	**14**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	3.35	11	South Korea	9.80	4.25	8
Outcomes of R&D efforts	0.77	16	South Korea	8.56	1.87	9

4.8 SOUTH KOREA

South Korea ranked first in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, South Korea was not ranked among the six best-ranked countries only in only Labor factor. South Korea is the most competitive economy in the Infrastructure and logistics and Technology and innovation factors and had the third best performance in five other factors. The country has the best transportation and telecommunications infrastructure and the fourth best energy infrastructure and international logistics. In Technology and innovation, it has the highest expenditure on Research and Development (R&D) as a proportion of GDP, the highest number of international patent applications and the highest share of high-tech goods and services in its exports. In five of the nine factors, South Korea is at least 12 positions ahead of Brazil. Compared to the 2018-2019 ranking (revised version), South Korea lost one position in the Labor, Taxation and Macroeconomic environment factors. Despite having lost positions, it remained in first place in the overall ranking.

TABLE 15 - SOUTH KOREA: STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	100
Population (millions)	51
GDP (billion USD)	1,720
GDP per capita, PPP (thousand USD)	43
Agricultural products exports (billion USD)	13
Total exports (billion USD)	604
Total imports (billion USD)	535

FIGURE 37 - BRAZIL-SOUTH KOREA COMPARISON

FIGURE 38 - SOUTH KOREA'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

Overall average: 7.1

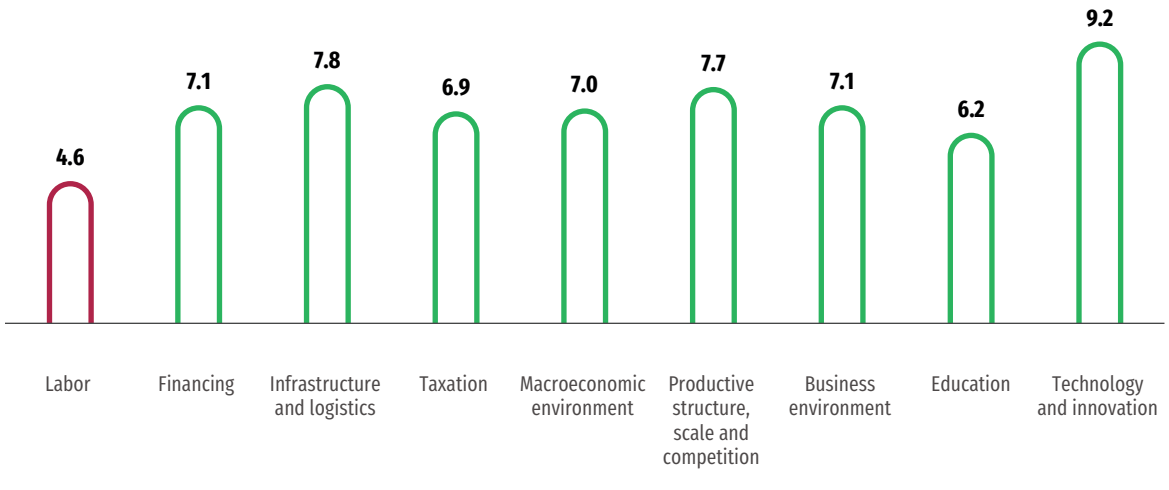


TABLE 16 - SOUTH KOREA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

SOUTH KOREA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.58**	**16**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	4.28	17	Turkey	5.77	5.10	13
Labor availability	4.87	13	Peru	7.12	5.22	10
Financing	**7.11**	**3**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	8.80	2	Spain	9.28	0.00	18
Capital availability	4.99	6	South Africa	6.78	2.92	11
Financial system performance	7.55	2	China	8.06	3.75	8
Infrastructure and logistics	**7.83**	**1**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	7.49	1	South Korea	7.49	3.88	17
Telecommunications infrastructure	9.60	1	South Korea	9.60	6.02	9
Energy infrastructure	5.93	4	Canada	6.12	3.43	18
International logistics	8.30	4	Spain	9.18	5.74	14
Taxation	**6.94**	**5**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.22	8	Indonesia	8.37	3.90	17
Quality of the tax system	7.65	3	Australia	8.22	3.75	18
Macroeconomic environment	**7.02**	**3**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.51	3	Thailand	9.62	8.87	14
Fiscal balance	5.56	3	Russia	5.85	3.66	18
External balance	6.01	3	Russia	6.31	5.35	7
Productive structure, scale and competition	**7.68**	**3**	**China**	**8.01**	**6.25**	**12**
Productive structure	9.47	1	South Korea	9.47	5.38	10
Scale	7.73	8	China	9.92	8.20	4
Competition	5.85	13	Poland	8.42	5.18	16
Business environment	**7.08**	**3**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	6.96	4	Australia	9.46	5.19	9
Legal certainty	7.65	2	Australia	8.24	5.05	15
Red tape	6.62	6	Canada	8.36	4.81	16
Education	**6.23**	**3**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	7.48	4	Australia	8.24	3.30	13
Educational assessment	8.35	1	South Korea	8.35	3.01	13
Expenditure on education	2.86	5	Australia	4.90	3.64	4
Technology and innovation	**9.18**	**1**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	9.80	1	South Korea	9.80	4.25	8
Outcomes of R&D efforts	8.56	1	South Korea	8.56	1.87	9

4.9 SPAIN

Spain is the fifth economy with the best performance in the ranking of the Brazil Competitiveness Report 2019-2020 – behind South Korea, Canada, Australia and China. Among the nine factors determining competitiveness, Spain is in the upper third (among the six best-ranked countries) in five. Spain has the second-best transportation infrastructure, the third-best telecommunications infrastructure and the best international logistics, occupying second position in the Infrastructure and logistics factor. In the Labor factor, it ranked last due to a combination of a relatively high labor cost and low availability of labor. Brazil is 13 positions behind Spain in Infrastructure and logistics and Financing factors – the largest gap between the two countries. As compared to the 2018-2019 ranking (revised version), Spain recorded a change only in the Taxation and Technology and innovation factors, losing one position in both. Despite these declines in positions, it remained in fifth position in the overall ranking.

TABLE 17 - SPAIN: STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	505
Population (millions)	46
GDP (billion USD)	1,427
GDP per capita, PPP (thousand USD)	40
Agricultural products exports (billion USD)	60
Total exports (billion USD)	345
Total imports (billion USD)	388

FIGURE 39 - BRAZIL-SPAIN COMPARISON

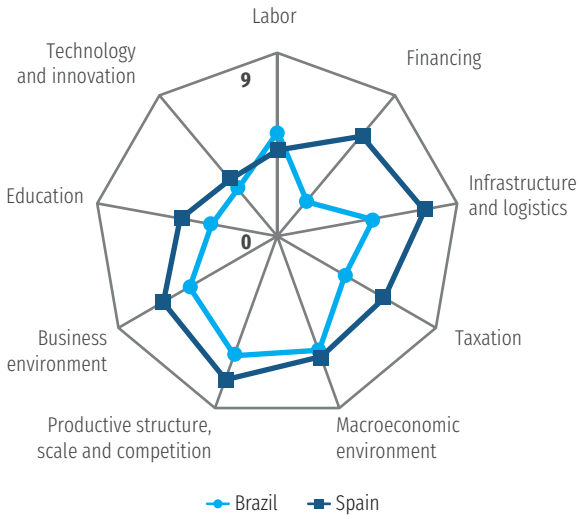


FIGURE 40 - SPAIN'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

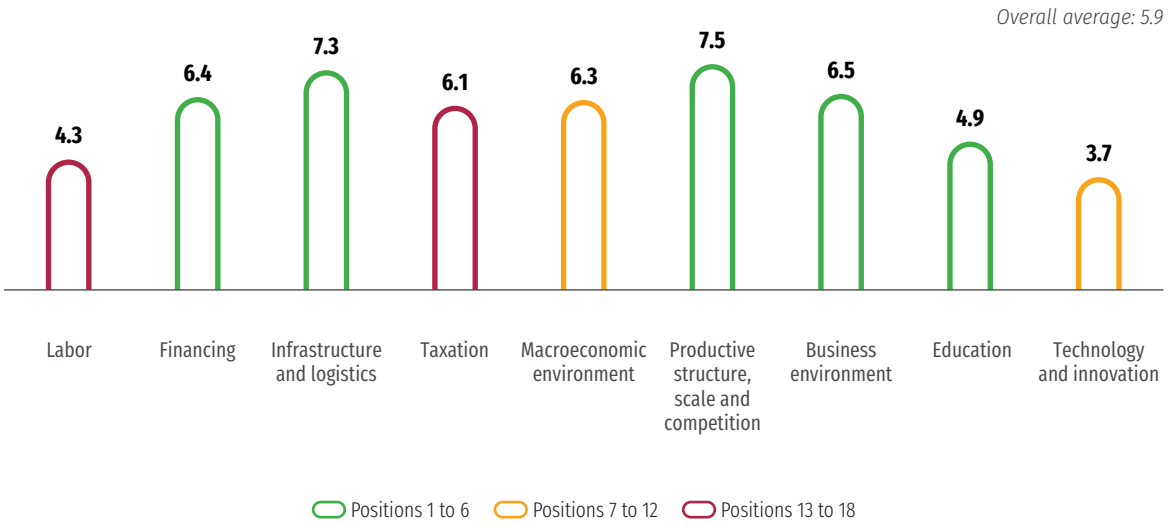


TABLE 18 - SPAIN:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

SPAIN			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.26**	**18**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	4.31	16	Turkey	5.77	5.10	13
Labor availability	4.20	17	Peru	7.12	5.22	10
Financing	**6.44**	**5**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	9.28	1	Spain	9.28	0.00	18
Capital availability	4.38	8	South Africa	6.78	2.92	11
Financial system performance	5.66	4	China	8.06	3.75	8
Infrastructure and logistics	**7.34**	**2**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	7.02	2	South Korea	7.49	3.88	17
Telecommunications infrastructure	8.30	3	South Korea	9.60	6.02	9
Energy infrastructure	4.85	14	Canada	6.12	3.43	18
International logistics	9.18	1	Spain	9.18	5.74	14
Taxation	**6.06**	**14**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	4.65	16	Indonesia	8.37	3.90	17
Quality of the tax system	7.48	5	Australia	8.22	3.75	18
Macroeconomic environment	**6.30**	**10**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.45	5	Thailand	9.62	8.87	14
Fiscal balance	3.89	17	Russia	5.85	3.66	18
External balance	5.57	4	Russia	6.31	5.35	7
Productive structure, scale and competition	**7.52**	**4**	**China**	**8.01**	**6.25**	**12**
Productive structure	6.75	6	South Korea	9.47	5.38	10
Scale	7.67	9	China	9.92	8.20	4
Competition	8.12	2	Poland	8.42	5.18	16
Business environment	**6.51**	**5**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	6.94	5	Australia	9.46	5.19	9
Legal certainty	6.82	6	Australia	8.24	5.05	15
Red tape	5.78	12	Canada	8.36	4.81	16
Education	**4.89**	**6**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	6.00	6	Australia	8.24	3.30	13
Educational assessment	6.63	5	South Korea	8.35	3.01	13
Expenditure on education	2.03	9	Australia	4.90	3.64	4
Technology and innovation	**3.67**	**7**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	4.30	7	South Korea	9.80	4.25	8
Outcomes of R&D efforts	3.03	7	South Korea	8.56	1.87	9

4.10 INDIA

India is in the bottom third of the ranking of the Brazil Competitiveness Report 2019-2020, ahead of the cases of Latin American countries (Colombia, Peru, Brazil and Argentina) and behind Indonesia. It was not ranked among the six best-ranked countries in any of the nine factors determining competitiveness. The worst result of India is in the Infrastructure and logistics factor, in which it ranked last. India has the worst telecommunications infrastructure, based on indicators of use and access to information and communication technologies, and the second worst energy infrastructure – ahead only of Brazil. Brazil ranked behind India in five of the nine factors: Financing, Taxation, Macroeconomic environment, Productive structure, scale and competition and Business environment. Compared to the 2018-2019 ranking (revised version), India moved up one position in the Labor and Education factors, but remained among the six worst-ranked countries. In the overall ranking, it remained in 14th position.

TABLE 19 - INDIA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	3,287
Population (millions)	1,334
GDP (billion USD)	2,718
GDP per capita, PPP (thousand USD)	7
Agricultural products exports (billion USD)	38
Total exports (billion USD)	324
Total imports (billion USD)	514

FIGURE 41 - BRAZIL-INDIA COMPARISON

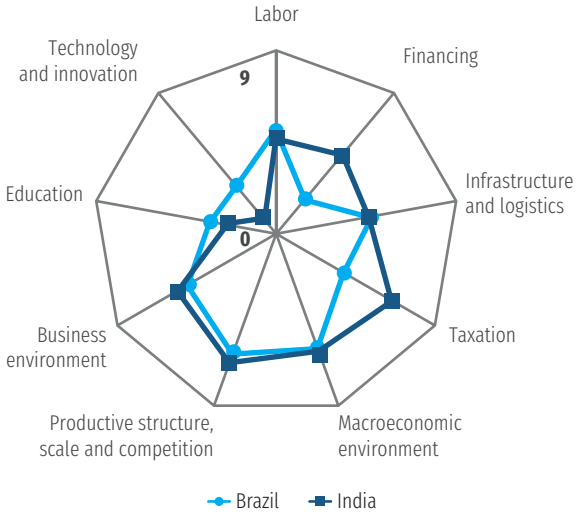
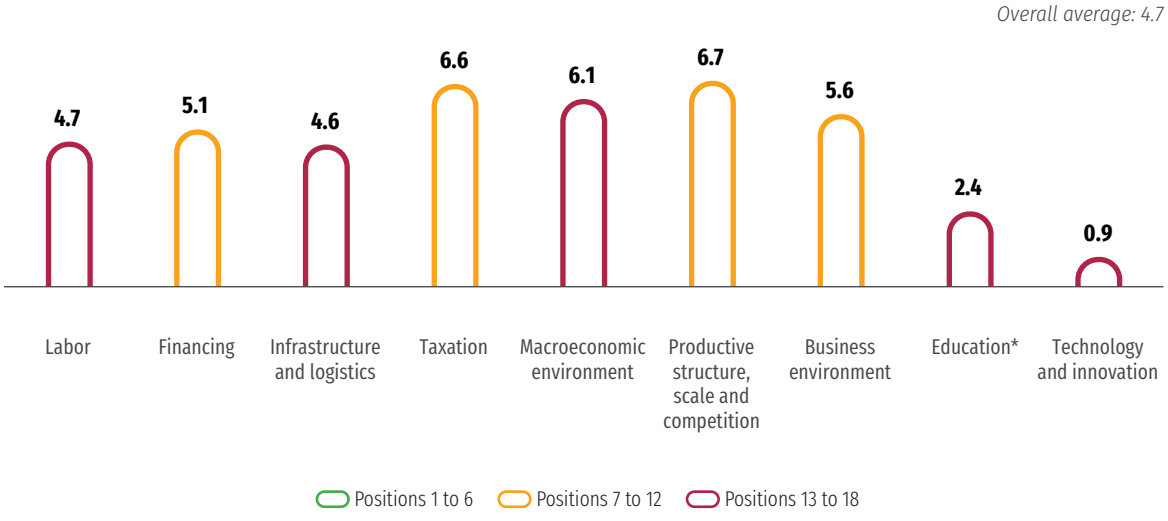


FIGURE 42 - INDIA'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)



*No information is available for India for subfactor Educational assessment, based on the results of PISA.

TABLE 20 - INDIA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

INDIA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.71**	**15**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.17	12	Turkey	5.77	5.10	13
Labor availability	4.24	16	Peru	7.12	5.22	10
Financing	**5.10**	**9**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	7.52	9	Spain	9.28	0.00	18
Capital availability	4.13	9	South Africa	6.78	2.92	11
Financial system performance	3.65	9	China	8.06	3.75	8
Infrastructure and logistics	**4.65**	**18**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.44	9	South Korea	7.49	3.88	17
Telecommunications infrastructure	2.08	18	South Korea	9.60	6.02	9
Energy infrastructure	4.26	17	Canada	6.12	3.43	18
International logistics	6.82	10	Spain	9.18	5.74	14
Taxation	**6.56**	**9**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.82	5	Indonesia	8.37	3.90	17
Quality of the tax system	6.30	12	Australia	8.22	3.75	18
Macroeconomic environment	**6.10**	**14**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	8.94	13	Thailand	9.62	8.87	14
Fiscal balance	4.18	15	Russia	5.85	3.66	18
External balance	5.19	11	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.70**	**9**	**China**	**8.01**	**6.25**	**12**
Productive structure	5.56	9	South Korea	9.47	5.38	10
Scale	9.18	2	China	9.92	8.20	4
Competition	5.36	15	Poland	8.42	5.18	16
Business environment	**5.58**	**9**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.77	12	Australia	9.46	5.19	9
Legal certainty	5.35	12	Australia	8.24	5.05	15
Red tape	6.62	7	Canada	8.36	4.81	16
Education	**2.44**	**16**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	3.02	15	Australia	8.24	3.30	13
Educational assessment	-	-	South Korea	8.35	3.01	13
Expenditure on education	1.85	13	Australia	4.90	3.64	4
Technology and innovation	**0.91**	**16**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	0.68	17	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.13	15	South Korea	8.56	1.87	9

4.11 INDONESIA

Indonesia is in 13th position in the ranking of the Brazil Competitiveness Report 2019-2020, one position behind the countries in the middle third (positions 7-12). Indonesia is in the upper third of the ranking in two of the nine factors determining competitiveness, namely: Labor and Taxation. In the Taxation factor, it is the best-ranked country, with the lowest tax burden (11.5% of GDP) and the fourth lowest total tax rate as percentage of profit (30.1%) among the 18 countries. Indonesia is not ahead of Brazil only in Education and Technology and innovation. Compared to the 2018-2019 ranking (revised version), Indonesia lost one position in the Labor factor and climbed positions in the Financing, Taxation and Productive structure, scale and competition factors. Despite these changes, it remained in 13th position, in the bottom third of the ranking.

TABLE 21 - INDONESIA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	1,913
Population (millions)	264
GDP (billion USD)	1,022
GDP per capita, PPP (thousand USD)	13
Agricultural products exports (billion USD)	46
Total exports (billion USD)	180
Total imports (billion USD)	188

FIGURE 43 - BRAZIL-INDONESIA COMPARISON

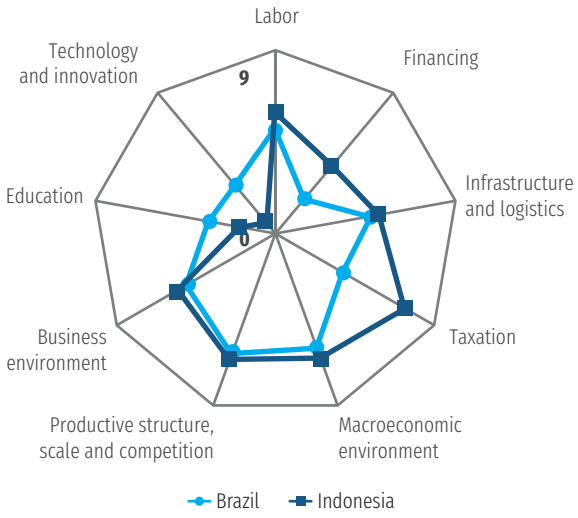


FIGURE 44 - INDONESIA'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

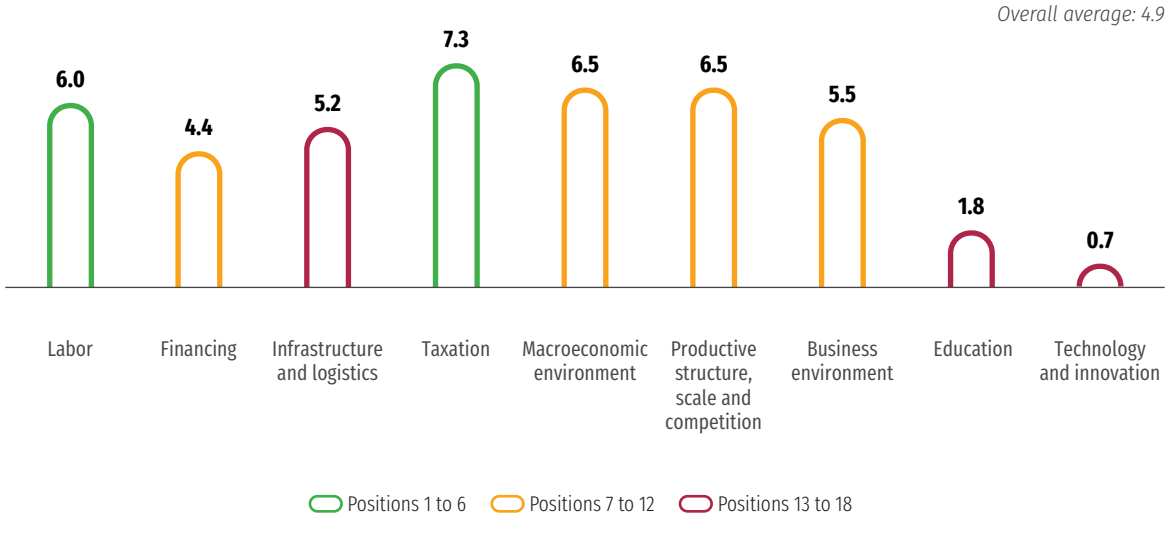


TABLE 22 - INDONESIA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

INDONESIA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.96**	**3**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.53	2	Turkey	5.77	5.10	13
Labor availability	6.38	3	Peru	7.12	5.22	10
Financing	**4.36**	**11**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	6.85	12	Spain	9.28	0.00	18
Capital availability	3.15	10	South Africa	6.78	2.92	11
Financial system performance	3.08	15	China	8.06	3.75	8
Infrastructure and logistics	**5.19**	**14**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	4.80	14	South Korea	7.49	3.88	17
Telecommunications infrastructure	4.39	16	South Korea	9.60	6.02	9
Energy infrastructure	5.59	8	Canada	6.12	3.43	18
International logistics	5.98	13	Spain	9.18	5.74	14
Taxation	**7.33**	**1**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	8.37	1	Indonesia	8.37	3.90	17
Quality of the tax system	6.29	13	Australia	8.22	3.75	18
Macroeconomic environment	**6.48**	**9**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.01	11	Thailand	9.62	8.87	14
Fiscal balance	5.37	6	Russia	5.85	3.66	18
External balance	5.07	13	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.54**	**10**	**China**	**8.01**	**6.25**	**12**
Productive structure	4.74	13	South Korea	9.47	5.38	10
Scale	8.20	5	China	9.92	8.20	4
Competition	6.69	5	Poland	8.42	5.18	16
Business environment	**5.49**	**11**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.07	18	Australia	9.46	5.19	9
Legal certainty	5.38	10	Australia	8.24	5.05	15
Red tape	7.03	5	Canada	8.36	4.81	16
Education	**1.78**	**17**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	2.14	17	Australia	8.24	3.30	13
Educational assessment	2.16	15	South Korea	8.35	3.01	13
Expenditure on education	1.04	17	Australia	4.90	3.64	4
Technology and innovation	**0.69**	**17**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	0.74	16	South Korea	9.80	4.25	8
Outcomes of R&D efforts	0.63	17	South Korea	8.56	1.87	9

4.12 MEXICO

Mexico ranked 12th in the ranking of the Brazil Competitiveness Report 2019-2020 and is in the middle third (position 7-12). Chile is also in the middle third of the ranking, in 8th position. The remaining Latin American countries – Colombia, Peru, Brazil and Argentina – are the four worst-ranked ones. Among the nine factors determining competitiveness, Mexico is one of the six best-ranked countries in the Labor and Productive structure, scale and competition factors. In 2018, Mexico had the third highest labor force growth rate (2.4%) and the third most complex productive structure among the 18 countries. Brazil is ahead of Mexico in only two factors: Education and Technology and innovation. As compared to the 2018-2019 ranking (revised version), Mexico climbed positions in the Labor, Financing, Taxation, Macroeconomic environment and Technology and Innovation factors and lost one position in Productive structure, scale and competition. Despite these improvements, it remained in 12th position in the overall ranking.

TABLE 23 - MEXICO: STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	1,964
Population (millions)	124
GDP (billion USD)	1,222
GDP per capita, PPP (thousand USD)	20
Agricultural products exports (billion USD)	35
Total exports (billion USD)	450
Total imports (billion USD)	476

FIGURE 45 - BRAZIL-MEXICO COMPARISON

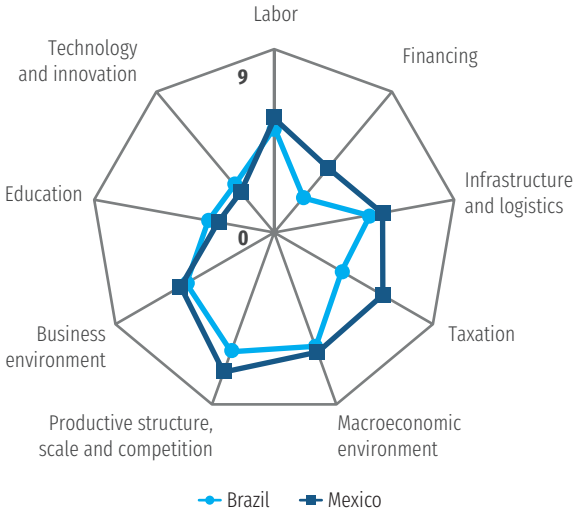


FIGURE 46 - MEXICO'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

Overall average: 5.1

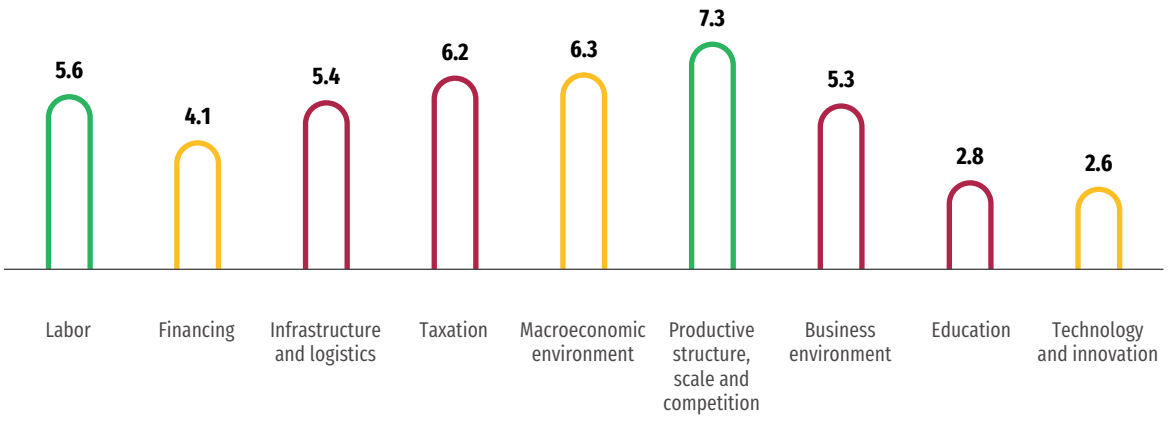


TABLE 24 - MEXICO:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

MEXICO			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.62**	**4**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.48	4	Turkey	5.77	5.10	13
Labor availability	5.76	4	Peru	7.12	5.22	10
Financing	**4.13**	**12**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	6.65	13	Spain	9.28	0.00	18
Capital availability	2.42	15	South Africa	6.78	2.92	11
Financial system performance	3.33	14	China	8.06	3.75	8
Infrastructure and logistics	**5.41**	**13**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.09	12	South Korea	7.49	3.88	17
Telecommunications infrastructure	4.92	14	South Korea	9.60	6.02	9
Energy infrastructure	5.13	13	Canada	6.12	3.43	18
International logistics	6.52	11	Spain	9.18	5.74	14
Taxation	**6.16**	**13**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.50	7	Indonesia	8.37	3.90	17
Quality of the tax system	5.83	14	Australia	8.22	3.75	18
Macroeconomic environment	**6.27**	**11**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	8.51	16	Thailand	9.62	8.87	14
Fiscal balance	5.06	9	Russia	5.85	3.66	18
External balance	5.23	9	Russia	6.31	5.35	7
Productive structure, scale and competition	**7.32**	**6**	**China**	**8.01**	**6.25**	**12**
Productive structure	7.70	3	South Korea	9.47	5.38	10
Scale	7.97	6	China	9.92	8.20	4
Competition	6.30	10	Poland	8.42	5.18	16
Business environment	**5.35**	**13**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.98	11	Australia	9.46	5.19	9
Legal certainty	5.07	14	Australia	8.24	5.05	15
Red tape	5.99	10	Canada	8.36	4.81	16
Education	**2.84**	**15**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	2.86	16	Australia	8.24	3.30	13
Educational assessment	3.72	9	South Korea	8.35	3.01	13
Expenditure on education	1.94	11	Australia	4.90	3.64	4
Technology and innovation	**2.60**	**10**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	1.84	14	South Korea	9.80	4.25	8
Outcomes of R&D efforts	3.35	6	South Korea	8.56	1.87	9

4.13 PERU

Peru is in the third-to-last position in the ranking of the Brazil Competitiveness Report 2019-2020, ahead only of Brazil and Argentina. Among the nine factors determining competitiveness, Peru is in the bottom third (among the six worst-ranked countries) in five of them. In Productive structure, scale and competition, Business environment and Technology and innovation, Peru is the worst-performing country among the 18 countries. It has the smallest domestic market and the least complex production structure. In 2018, it had the lowest expenditure on Research and Development (R&D) as a proportion of GDP (0.12%) and the lowest percentage of high-tech exports in total exports (2.4%). Brazil is behind Peru in Financing, Taxation, Macroeconomic environment and Education. In comparison with the 2018-2019 ranking (revised version), Peru climbed positions in the Financing and Macroeconomic environment factors and lost positions in Taxation and Education.

TABLE 25 - PERU:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	1,285
Population (millions)	32
GDP (billion USD)	225
GDP per capita, PPP (thousand USD)	14
Agricultural products exports (billion USD)	10
Total exports (billion USD)	49
Total imports (billion USD)	43

FIGURE 47 - BRAZIL-PERU COMPARISON

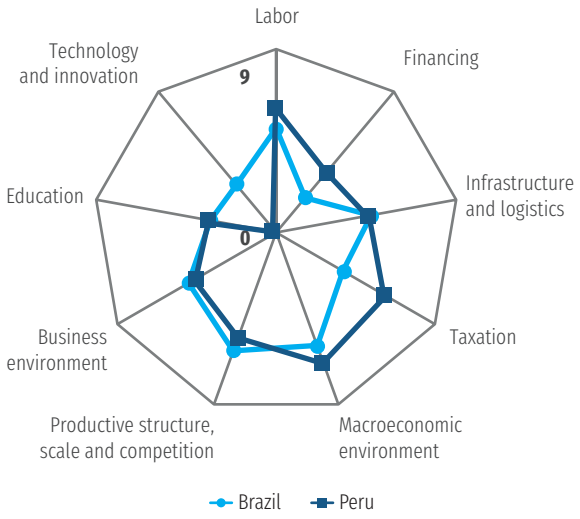


FIGURE 48 - PERU'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

Overall average: 4.6

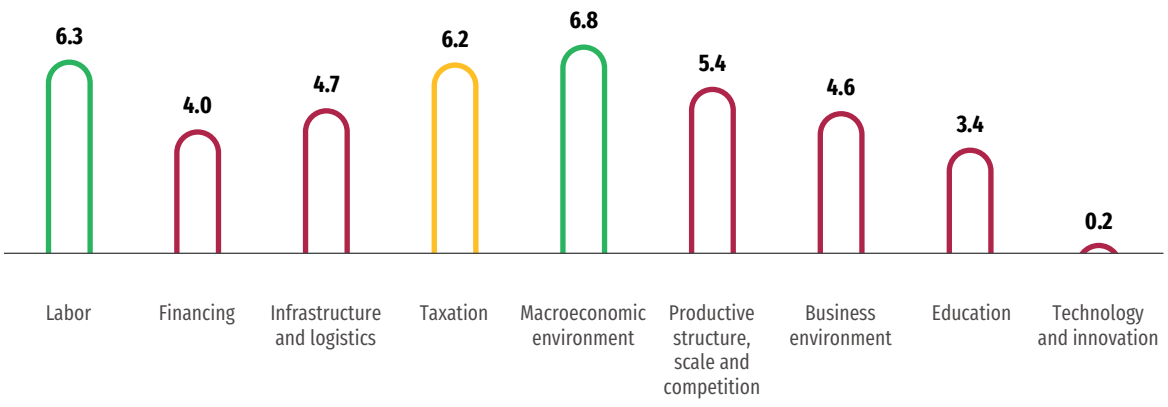


TABLE 26 - PERU:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

PERU			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**6.28**	**1**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.44	5	Turkey	5.77	5.10	13
Labor availability	7.12	1	Peru	7.12	5.22	10
Financing	**3.97**	**14**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	5.99	16	Spain	9.28	0.00	18
Capital availability	2.52	12	South Africa	6.78	2.92	11
Financial system performance	3.41	12	China	8.06	3.75	8
Infrastructure and logistics	**4.72**	**16**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	3.79	18	South Korea	7.49	3.88	17
Telecommunications infrastructure	4.16	17	South Korea	9.60	6.02	9
Energy infrastructure	5.75	6	Canada	6.12	3.43	18
International logistics	5.17	18	Spain	9.18	5.74	14
Taxation	**6.21**	**12**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	7.54	3	Indonesia	8.37	3.90	17
Quality of the tax system	4.88	17	Australia	8.22	3.75	18
Macroeconomic environment	**6.78**	**4**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.55	2	Thailand	9.62	8.87	14
Fiscal balance	5.53	4	Russia	5.85	3.66	18
External balance	5.25	8	Russia	6.31	5.35	7
Productive structure, scale and competition	**5.43**	**18**	**China**	**8.01**	**6.25**	**12**
Productive structure	3.23	18	South Korea	9.47	5.38	10
Scale	6.42	18	China	9.92	8.20	4
Competition	6.63	6	Poland	8.42	5.18	16
Business environment	**4.61**	**18**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.30	16	Australia	9.46	5.19	9
Legal certainty	4.76	17	Australia	8.24	5.05	15
Red tape	4.76	17	Canada	8.36	4.81	16
Education	**3.40**	**12**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	5.71	8	Australia	8.24	3.30	13
Educational assessment	3.05	12	South Korea	8.35	3.01	13
Expenditure on education	1.44	15	Australia	4.90	3.64	4
Technology and innovation	**0.19**	**18**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	0.12	18	South Korea	9.80	4.25	8
Outcomes of R&D efforts	0.25	18	South Korea	8.56	1.87	9

4.14 POLAND

Poland is the seventh best-ranked economy in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, Poland is in the upper third (among the six best-ranked countries) in the Infrastructure and logistics, Macroeconomic environment, Productive structure, scale and competition and Education factors. Poland has the second-best International logistics system after Spain. In 2018, it had the lowest average tariff charged on imports (1.12%) and the highest score regarding market concentration. Its productive structure is the fourth most complex among the 18 countries. In Education, the quality of the education provided to Polish students, based on PISA tests, is the third best one, behind South Korea and Canada. Brazil is ahead of Poland only in the Labor factor. In relation to the 2018-2019 ranking (revised version), Poland fell to 15th position in Taxation and climbed to 6th position in Macroeconomic environment and in Technology and innovation.

TABLE 27 - POLAND:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	312
Population (millions)	37
GDP (billion USD)	585
GDP per capita, PPP (thousand USD)	32
Agricultural products exports (billion USD)	37
Total exports (billion USD)	260
Total imports (billion USD)	266

FIGURE 49 - BRAZIL-POLAND COMPARISON

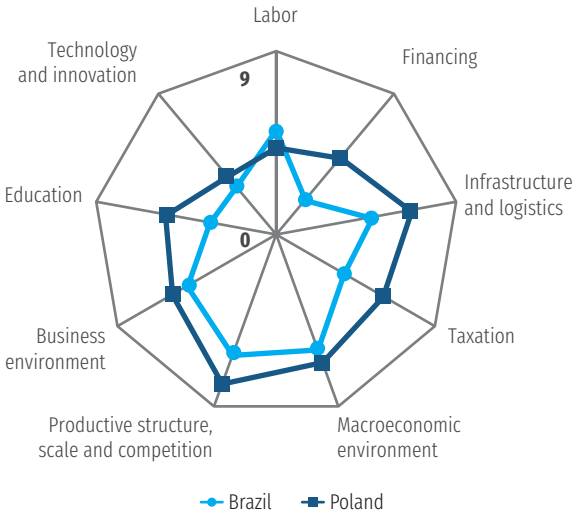


FIGURE 50 - POLAND'S PERFORMANCE
Average scores (0 = worst performance; 10 = best performance)

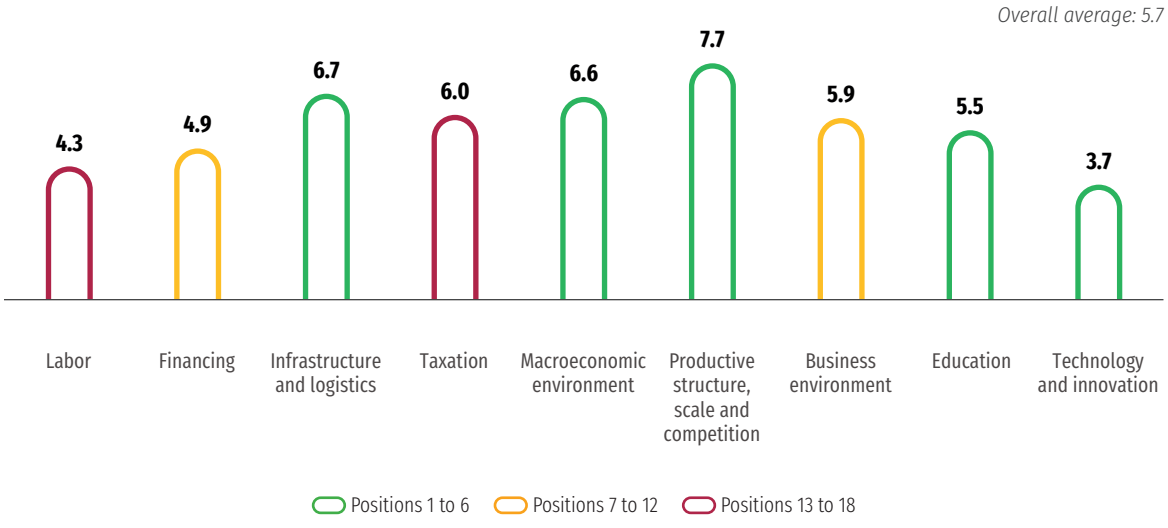


TABLE 28 - POLAND:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

POLAND			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**4.28**	**17**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.04	14	Turkey	5.77	5.10	13
Labor availability	3.53	18	Peru	7.12	5.22	10
Financing	**4.93**	**10**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	8.17	6	Spain	9.28	0.00	18
Capital availability	2.29	16	South Africa	6.78	2.92	11
Financial system performance	4.35	7	China	8.06	3.75	8
Infrastructure and logistics	**6.72**	**5**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.45	8	South Korea	7.49	3.88	17
Telecommunications infrastructure	7.42	5	South Korea	9.60	6.02	9
Energy infrastructure	5.48	10	Canada	6.12	3.43	18
International logistics	8.53	2	Spain	9.18	5.74	14
Taxation	**6.04**	**15**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	4.93	15	Indonesia	8.37	3.90	17
Quality of the tax system	7.14	8	Australia	8.22	3.75	18
Macroeconomic environment	**6.62**	**6**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.47	4	Thailand	9.62	8.87	14
Fiscal balance	5.01	11	Russia	5.85	3.66	18
External balance	5.38	6	Russia	6.31	5.35	7
Productive structure, scale and competition	**7.73**	**2**	**China**	**8.01**	**6.25**	**12**
Productive structure	7.53	4	South Korea	9.47	5.38	10
Scale	7.25	12	China	9.92	8.20	4
Competition	8.42	1	Poland	8.42	5.18	16
Business environment	**5.87**	**8**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	6.48	6	Australia	9.46	5.19	9
Legal certainty	5.49	9	Australia	8.24	5.05	15
Red tape	5.63	14	Canada	8.36	4.81	16
Education	**5.51**	**4**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	6.44	5	Australia	8.24	3.30	13
Educational assessment	8.06	3	South Korea	8.35	3.01	13
Expenditure on education	2.03	10	Australia	4.90	3.64	4
Technology and innovation	**3.74**	**6**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	4.52	5	South Korea	9.80	4.25	8
Outcomes of R&D efforts	2.95	8	South Korea	8.56	1.87	9

4.15 RUSSIA

Russia is in ninth position in the overall ranking of the Brazil Competitiveness Report 2019-2020, in the middle third (positions 7-12). Among the nine factors determining competitiveness, Russia is in the upper third (positions 1-6) in three of them: Taxation, Macroeconomic environment and Education. In 2018, Russia had the lowest government debt as a proportion of GDP (14.6%) and the fifth lowest interest burden (0.5%). Regarding the foreign trade sector, it recorded the largest current account surplus as a proportion of GDP (6.8%). A little more than half of its adult population (between 25 and 64 years old) completed higher education – the second-best result, behind Canada. Despite recording the lowest expenditure on education, it is among the six best-ranked countries in education quality, as measured based on PISA 2018. Brazil is not behind Russia only in the Labor and Technology and innovation factors. Compared to the 2018-2019 ranking (revised version), Russia lost positions in Taxation and Technology and innovation and climbed positions in Macroeconomic environment and Productive Structure, scale and competition. Despite these changes, it remained in the same position in the overall ranking.

TABLE 29 - RUSSIA:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	17,098
Population (millions)	146
GDP (billion USD)	1,657
GDP per capita, PPP (thousand USD)	28
Agricultural products exports (billion USD)	34
Total exports (billion USD)	443
Total imports (billion USD)	248

FIGURE 51 - BRAZIL-RUSSIA COMPARISON

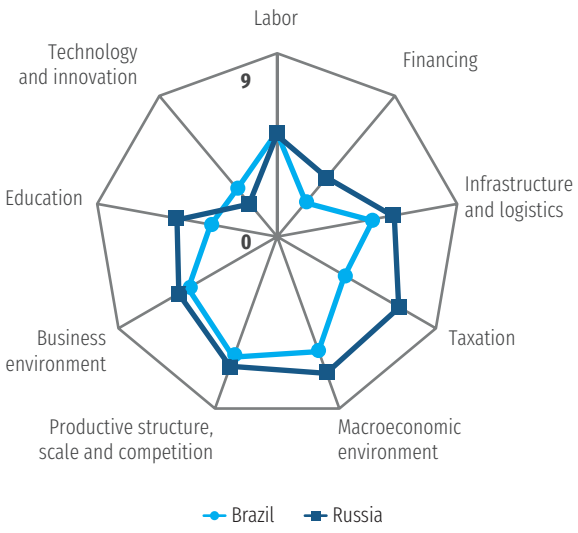


FIGURE 52 - RUSSIA'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

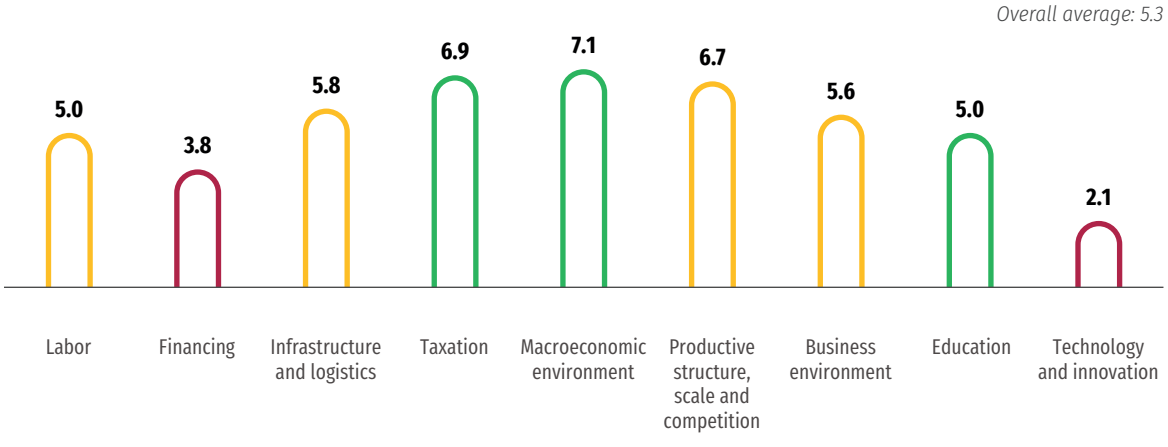


TABLE 30 - RUSSIA:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

RUSSIA			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.02**	**12**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.49	3	Turkey	5.77	5.10	13
Labor availability	4.55	15	Peru	7.12	5.22	10
Financing	**3.83**	**16**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	5.69	17	Spain	9.28	0.00	18
Capital availability	2.26	17	South Africa	6.78	2.92	11
Financial system performance	3.53	10	China	8.06	3.75	8
Infrastructure and logistics	**5.85**	**9**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.35	11	South Korea	7.49	3.88	17
Telecommunications infrastructure	7.13	7	South Korea	9.60	6.02	9
Energy infrastructure	5.58	9	Canada	6.12	3.43	18
International logistics	5.33	16	Spain	9.18	5.74	14
Taxation	**6.91**	**6**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.61	6	Indonesia	8.37	3.90	17
Quality of the tax system	7.22	7	Australia	8.22	3.75	18
Macroeconomic environment	**7.09**	**1**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.10	10	Thailand	9.62	8.87	14
Fiscal balance	5.85	1	Russia	5.85	3.66	18
External balance	6.31	1	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.73**	**8**	**China**	**8.01**	**6.25**	**12**
Productive structure	5.37	11	South Korea	9.47	5.38	10
Scale	8.29	3	China	9.92	8.20	4
Competition	6.52	7	Poland	8.42	5.18	16
Business environment	**5.55**	**10**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.08	17	Australia	9.46	5.19	9
Legal certainty	5.30	13	Australia	8.24	5.05	15
Red tape	7.27	4	Canada	8.36	4.81	16
Education	**4.97**	**5**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	7.98	2	Australia	8.24	3.30	13
Educational assessment	6.63	6	South Korea	8.35	3.01	13
Expenditure on education	0.30	18	Australia	4.90	3.64	4
Technology and innovation	**2.13**	**13**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	3.00	12	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.27	14	South Korea	8.56	1.87	9

4.16 THAILAND

Thailand is the sixth economy with the best performance in the ranking of the Brazil Competitiveness Report 2019-2020. Among the nine factors determining competitiveness, Thailand is in the upper third (positions 1-6) in five of them: Labor, Financing, Taxation, Macroeconomic environment and Technology and innovation. In 2018, Thailand recorded the lowest inflation rate (1.1%) and the second largest current account surplus as a proportion of GDP (6.4%), and it was the second best-performing country in the Macroeconomic environment factor among the 18 countries assessed. In Taxation, Thailand had the sixth lowest tax burden (17.6%) and the third lowest total tax rate as percentage of profit (29.5%). These are the factors in which the gap between Thailand and Brazil is the largest (advantage of 14 positions). In relation to the 2018-2019 ranking (revised version), it lost positions in Macroeconomic environment, Productive structure, scale and competition and Education, and climbed positions in Labor and Technology and innovation. Despite these changes, it remained in sixth position in the overall ranking.

TABLE 31 - THAILAND:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	513
Population (millions)	67
GDP (billion USD)	504
GDP per capita, PPP (thousand USD)	19
Agricultural products exports (billion USD)	44
Total exports (billion USD)	252
Total imports (billion USD)	248

FIGURE 53 - BRAZIL-THAILAND COMPARISON

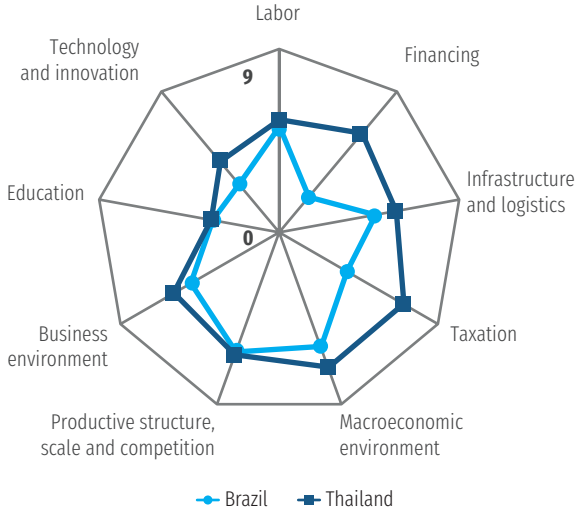


FIGURE 54 - THAILAND'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

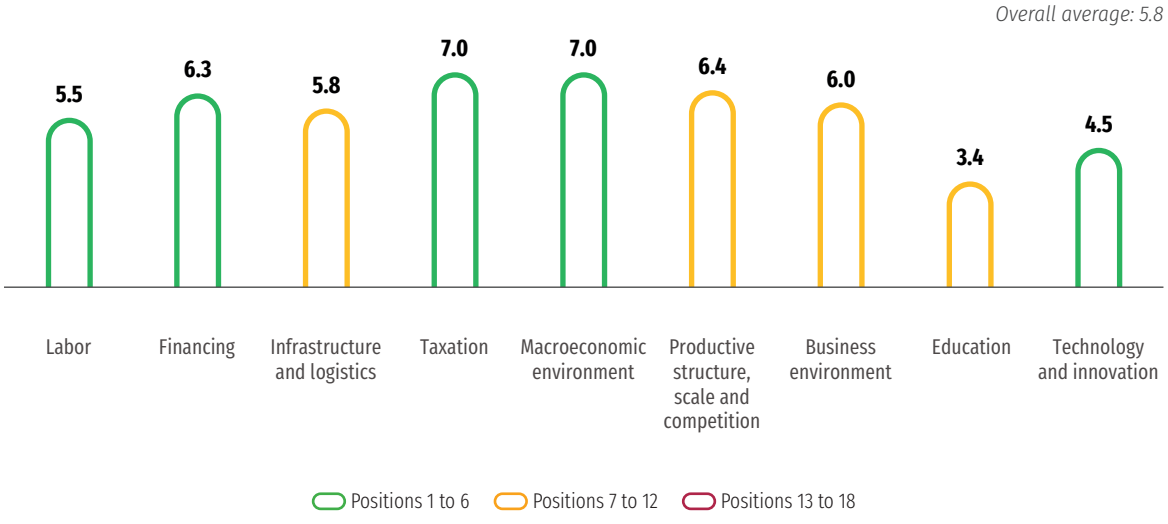


TABLE 32 - THAILAND:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS

Average scores (0 = worst performance; 10 = best performance) and position in the ranking

THAILAND			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.49**	**5**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.43	6	Turkey	5.77	5.10	13
Labor availability	5.55	6	Peru	7.12	5.22	10
Financing	**6.29**	**6**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	7.72	8	Spain	9.28	0.00	18
Capital availability	5.53	3	South Africa	6.78	2.92	11
Financial system performance	5.61	5	China	8.06	3.75	8
Infrastructure and logistics	**5.80**	**10**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	4.97	13	South Korea	7.49	3.88	17
Telecommunications infrastructure	5.50	12	South Korea	9.60	6.02	9
Energy infrastructure	5.30	11	Canada	6.12	3.43	18
International logistics	7.45	7	Spain	9.18	5.74	14
Taxation	**7.02**	**3**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	7.62	2	Indonesia	8.37	3.90	17
Quality of the tax system	6.42	11	Australia	8.22	3.75	18
Macroeconomic environment	**7.05**	**2**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	9.62	1	Thailand	9.62	8.87	14
Fiscal balance	5.27	7	Russia	5.85	3.66	18
External balance	6.26	2	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.41**	**11**	**China**	**8.01**	**6.25**	**12**
Productive structure	7.42	5	South Korea	9.47	5.38	10
Scale	7.23	13	China	9.92	8.20	4
Competition	4.57	18	Poland	8.42	5.18	16
Business environment	**5.98**	**7**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.43	14	Australia	9.46	5.19	9
Legal certainty	5.94	7	Australia	8.24	5.05	15
Red tape	7.58	3	Canada	8.36	4.81	16
Education	**3.40**	**11**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	5.31	10	Australia	8.24	3.30	13
Educational assessment	3.52	10	South Korea	8.35	3.01	13
Expenditure on education	1.38	16	Australia	4.90	3.64	4
Technology and innovation	**4.50**	**4**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	5.66	4	South Korea	9.80	4.25	8
Outcomes of R&D efforts	3.35	5	South Korea	8.56	1.87	9

4.17 TURKEY

Turkey is in 11th position in the ranking of the Brazil Competitiveness Report 2019-2020, in the middle third (positions 7-12). Among the nine factors determining competitiveness, Turkey is in the bottom third (among the six worst-ranked countries) in two of them, Financing and Macroeconomic environment. In Taxation, Turkey recorded the best postfiling index, which measures the time to obtain tax refunds and to comply with a corporate income tax correction, ranking fourth in this factor – the country's best position. Turkey is ahead of Brazil in most factors, except in the following ones: Macroeconomic environment and Technology and innovation, in which it is behind Brazil, in 17th and 9th position, respectively. In comparison with the 2018-2019 ranking (revised version), Turkey lost positions in the Labor, Financing and Infrastructure and logistics factors and moved up positions in Productive structure, scale and competition, Business environment and Education. On the overall average, the indicator for Turkey increased from 4.91 to 5.11 on a scale of 0-10 (best performance). This improvement was not enough for Turkey to move up positions and it remained in the middle third, in 11th place.

TABLE 33 - TURKEY:
STRUCTURAL CHARACTERISTICS

Area (thousand sq. km)	785
Population (millions)	82
GDP (billion USD)	771
GDP per capita, PPP (thousand USD)	28
Agricultural products exports (billion USD)	18
Total exports (billion USD)	167
Total imports (billion USD)	223

FIGURE 55 - BRAZIL-TURKEY COMPARISON

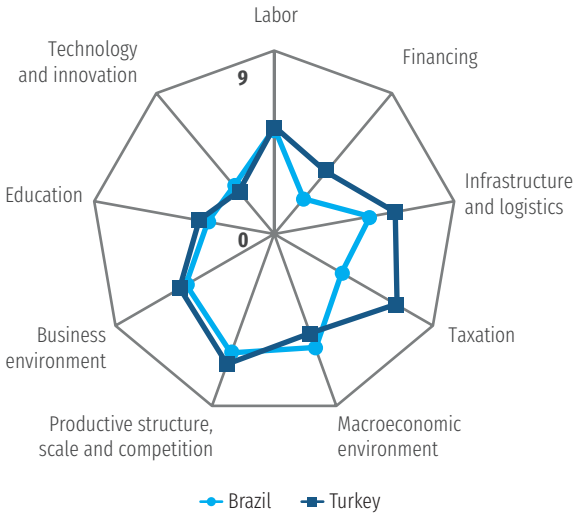


FIGURE 56 - TURKEY'S PERFORMANCE

Average scores (0 = worst performance; 10 = best performance)

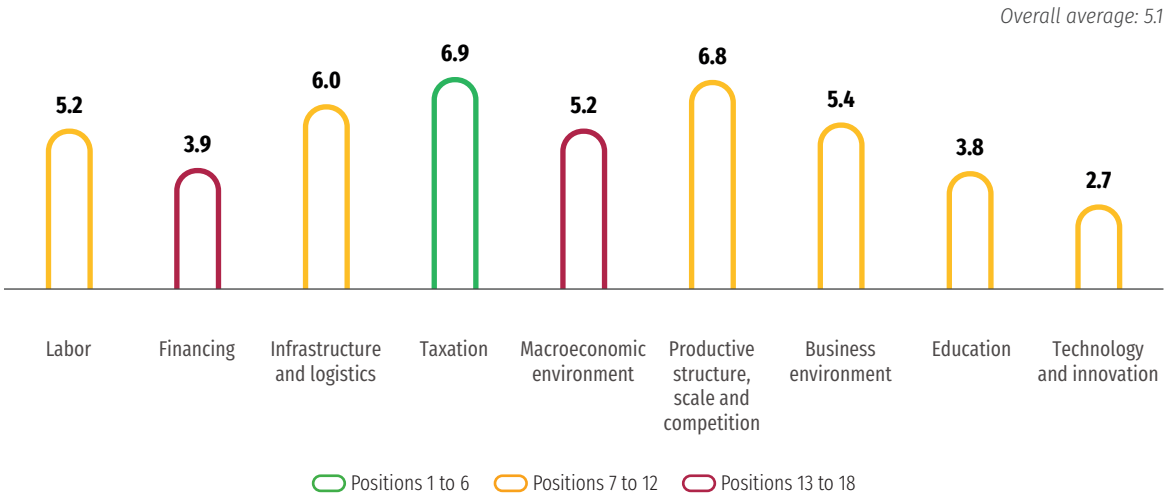


TABLE 34 - TURKEY:
PERFORMANCE IN THE FACTORS AND SUBFACTORS DETERMINING COMPETITIVENESS
Average scores (0 = worst performance; 10 = best performance) and position in the ranking

TURKEY			BEST PERFORMER		BRAZIL	
Factor/Subfactor	**Score**	**Rank**	**Country**	**Score**	**Score**	**Rank**
Labor	**5.24**	**8**	**Peru**	**6.28**	**5.16**	**9**
Labor cost	5.77	1	Turkey	5.77	5.10	13
Labor availability	4.71	14	Peru	7.12	5.22	10
Financing	**3.95**	**15**	**Canada**	**7.65**	**2.22**	**18**
Capital cost	6.95	11	Spain	9.28	0.00	18
Capital availability	2.45	14	South Africa	6.78	2.92	11
Financial system performance	2.44	16	China	8.06	3.75	8
Infrastructure and logistics	**6.02**	**8**	**South Korea**	**7.83**	**4.77**	**15**
Transport infrastructure	5.79	6	South Korea	7.49	3.88	17
Telecommunications infrastructure	5.83	11	South Korea	9.60	6.02	9
Energy infrastructure	5.24	12	Canada	6.12	3.43	18
International logistics	7.22	8	Spain	9.18	5.74	14
Taxation	**6.95**	**4**	**Indonesia**	**7.33**	**3.82**	**17**
Tax burden	6.02	11	Indonesia	8.37	3.90	17
Quality of the tax system	7.87	2	Australia	8.22	3.75	18
Macroeconomic environment	**5.20**	**17**	**Russia**	**7.09**	**5.96**	**16**
Monetary balance	5.20	17	Thailand	9.62	8.87	14
Fiscal balance	5.40	5	Russia	5.85	3.66	18
External balance	5.01	15	Russia	6.31	5.35	7
Productive structure, scale and competition	**6.83**	**7**	**China**	**8.01**	**6.25**	**12**
Productive structure	6.29	8	South Korea	9.47	5.38	10
Scale	7.93	7	China	9.92	8.20	4
Competition	6.28	11	Poland	8.42	5.18	16
Business environment	**5.38**	**12**	**Canada**	**8.40**	**5.02**	**16**
Government Efficiency	4.44	13	Australia	9.46	5.19	9
Legal certainty	5.36	11	Australia	8.24	5.05	15
Red tape	6.33	9	Canada	8.36	4.81	16
Education	**3.75**	**9**	**Australia**	**6.86**	**3.32**	**13**
Educational attainment	3.18	14	Australia	8.24	3.30	13
Educational assessment	5.81	7	South Korea	8.35	3.01	13
Expenditure on education	2.27	8	Australia	4.90	3.64	4
Technology and innovation	**2.70**	**9**	**South Korea**	**9.18**	**3.06**	**8**
R&D efforts	4.03	9	South Korea	9.80	4.25	8
Outcomes of R&D efforts	1.36	13	South Korea	8.56	1.87	9

APPENDIX A
METHODOLOGICAL NOTE

ABOUT THE REPORT

CNI's agenda places priority on improving the competitiveness of industry and, consequently, of the Brazilian economy. This is the focus behind the motivation to draw up the **Brazil Competitiveness Report**, which was first published in 2010. Since then, the following editions were published: 2012, 2013, 2014, 2016, 2017-2018 and 2018-2019.

The reporting period for this report is 2019 or the year for which the latest data is available for each variable and country. In most cases, data for 2018 is the most up-to-date, but there are cases in which data from earlier years is used[13].

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.

METHODOLOGICAL CHANGES

The 2019-2020 edition includes methodological improvements to ensure a better measurement of the competitiveness factors and align the analysis with the factors addressed in the Strategy Map for Industry 2018-2022.

The first set of changes refers only to changes in the names of the factors determining competitiveness, so as to facilitate comparisons with the key factors addressed in the Strategy Map for Industry 2018-2022. Thus, the factors Availability and cost of labor and Availability and cost of capital were renamed, respectively, to Labor and Financing with the aim of establishing a clear link with the key factors addressed in the Strategy Map for Industry 2018-2022[14].

The Taxation factor was subdivided into two subfactors: Tax burden and Quality of the tax system. The tax burden is composed of two measures of tax burden – in relation to GDP and to total tax rate (% of profit). The subfactor Quality of the tax system is made up of three variables: Number of payments, Postfiling index and Distortive effects of taxes and subsidies on competition. In the previous version, the Taxation factor only included

13 The cases of countries with data whose lag exceeds two years are rare. Furthermore, these are, in general, indicators that do not change in the short term.
14 The key factors addressed in the Strategic Map of Industry 2018-2022 related to the three factors determining competitiveness are the following ones: Financing, included in the Production factors group; Taxation and Labor Relations, included in the Business environment and production costs group. Learn more about the Map at: http://portaldaindustria.com.br/cni/canais/mapa-estrategico-da-industria/

the Taxes subfactor, with two measures of tax burden and two variables corresponding to direct and indirect tax rates.

The Macroeconomic environment factor assesses conditions of stability and predictability, which are essential for investment growth. For this purpose, the factor was subdivided into three sub-factors: monetary balance, fiscal balance and external balance.

In the previous version, the Macroeconomic environment factor only included the subfactor Macroeconomic indicators, with six associated variables: one related to monetary balance, two referring to fiscal balance and three other outcome variables, i.e. variables reflecting the stability of the environment (gross capital formation, foreign direct investment in the country and exchange rate). Therefore, the change consisted in including a variable for external balance – another one for macroeconomic stability in itself – and in excluding the outcome variables.

For purposes of comparison with the previous edition, the 2018-2019 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 2018-2019 of the overall ranking can be found in Appendix C.

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:

- Labor;
- Financing;
- Infrastructure and logistics;
- Taxation;
- Technology and innovation.

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

- Macroeconomic environment;
- Productive structure, scale and competition;
- Business environment;
- Education.

These factors were divided into 25 subfactors, to which 61 variables were associated. The starting point for assessing the competitiveness of Brazilian companies is the value assumed by these 61 variables in Brazil and in 17 other countries. This set of variables comprises 46 economic variables disseminated in international and national databases, as well as 15 qualitative variables. As such, the quantitative variables account for 75% of the set of variables, and the qualitative variables account for 25%.

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 A1 shows the distribution of variables according to their factors and subfactors. A list of the 61 variables with their definition and corresponding sources can be found in Appendix B of this report.

TABLE A1 - 2019-2020 REPORT: FACTORS, SUBFACTORS AND VARIABLES

VARIABLES	WEIGHT
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%
Financing	
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%
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	
Tax burden	*50%*
Tax revenue (% of GDP)	50%
Total tax rate (% of profit)	50%
Quality of the tax system	*50%*
Payments (number per year)	33.3%
Postfiling index (0-100)	33.3%
Distortive effect of taxes and subsidies on competition	33.3%
Macroeconomic environment	
Monetary balance	*33.3%*
Inflation	100%
Fiscal balance	*33.3%*
General government debt	50%
General government net debt interest payments	50%
External balance	*33.3%*
Current account balance (% of GDP)	100%
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 Index	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%

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 reading	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 like 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 A2 - STRUCTURAL CHARACTERISTICS OF THE SELECTED COUNTRIES - 2018

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	58	368	14	12	94	114
Argentina	2,780	44	519	20	34	61	65
Australia	7,741	25	1,420	52	36	257	235
Brazil	**8,515**	**208**	**1,867**	**16**	**93**	**239**	**188**
Canada	9,984	36	1,712	49	69	450	470
Chile	756	18	298	25	24	75	75
China	9,562	1,395	13,368	18	82	2,486	2,135
Colombia	1,141	49	330	14	7	41	51
South Africa	100	51	1,720	43	13	604	535
Spain	505	46	1,427	40	60	345	388
India	3,287	1,334	2,718	7	38	324	514
Indonesia	1,913	264	1,022	13	46	180	188
Mexico	1,964	124	1,222	20	35	450	476
Peru	1,285	32	225	14	10	49	43
Poland	312	37	585	32	37	260	266
Russia	17,098	146	1,657	28	34	443	248
Thailand	513	67	504	19	44	252	248
Turkey	785	82	771	28	18	167	223

Source: World Development Indicators, World Bank; World Economic Outlook Database, Oct. 2019, IMF; WTO merchandise trade by commodity group, WTO.

PROCEDURES ADOPTED

The effect of each of the 61 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 61 variables were aggregated into 25 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 61 variables comprises quantitative variables that reflect economic magnitudes, as well as qualitative variables derived from surveys.

The qualitative variables are based on different scales, as they were derived from different surveys. 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:

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

Where: VN_i^v 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:

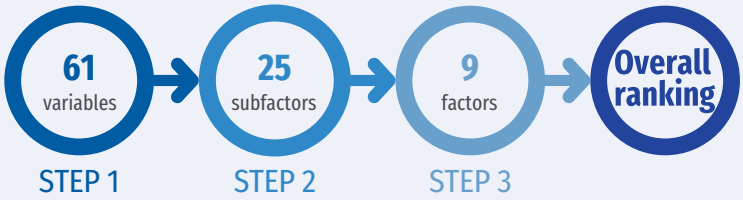
$$VN_i^v = 10 - 10 \times \frac{V_i - V_{min}}{V_{max} - V_{min}} \qquad (2)$$

AGGREGATION OF VARIABLES INTO SUBFACTORS AND FACTORS

The scores of the subfactor are the weighted average of the normalized variables associated with the subfactor (the weights are shown in table A1 above). Factor scores were determined by the simple average of the scores for the subfactors associated with them.

The positions of the country in the overall ranking are determined by the simple average of the scores for the nine factors.

FIGURE A1 - AGGREGATION PROCESS



To calculate the annual ranking of the Brazil Competitiveness Report, it is necessary to collect data for the 61 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 2018 and the most recent data available for the country is from 2016, the value recorded in 2016 is repeated for 2018.

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 overall 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 2019-2020 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 for China is available;

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

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 only case of missing data in the 2019-2020 overall ranking is that of China in the Education factor.

APPENDIX B
LIST OF VARIABLES

Description and source of the variables

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Labor		
Labor cost		
Compensation levels in manufacturing	Total hourly compensation in manufacturing (wages plus supplementary benefits), US$ *Reference year: 2018*	IMD World Competitiveness Yearbook 2019 [Passport GMID; "Source: © Euromonitor International 2019"; national sources]
Labor productivity in industry	Related GDP (PPP) per person employed in industry (in thousands of US$, constant 2011 prices) *Reference year: 2018*	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: 2018*	ILOSTAT – International Labour Organization (ILO) [ILO modelled estimates, July 2019]
Labor force growth	Percentage change *Reference year: 2018*	IMD World Competitiveness Yearbook 2019 [OECD (2019), "Main Economic Indicators - complete database; national sources]
Financing		
Capital cost		
Interest rate spread	Lending rate minus deposit rate *Reference year: 2018*	IMD World Competitiveness Yearbook 2019. [International Financial Statistics Online April 2019 (IMF); national sources].
Real short-term interest rate	Real discount or bank rate *Reference year: 2018*	IMD World Competitiveness Yearbook 2018 [International Financial Statistics Online April 2019 (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: 2015-2017, moving average*	The Global Competitiveness Report 2019, World Economic Forum [The World Bank Group]
Stock market size	Market value for listed domestic companies as a percentage of GDP. *Reference year: 2018*	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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, World Economic Forum [Executive Opinion Survey]
Financial system performance		
Banking sector assets	Percentage of GDP *Reference year: 2018*	IMD World Competitiveness Yearbook 2018 [IMF Monetary and Financial Stats (MFS) April 2019]
Country credit rating	Rating on a scale of 0-100 assessed by the Institutional Investor Magazine *Reference year: 2018*	IMD World Competitiveness Yearbook 2018 [Fitch Ratings, Moody's Corporation and Standard & Poor's]

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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, 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: 2019*	The Global Competitiveness Report 2019, 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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, World Economic Forum [Executive Opinion Survey]
Railroad density	Kilometers of railroad per 100 square kilometers of land *Reference year: 2017 or most recent available data*	The Global Competitiveness Report 2019, 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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, 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 2006 and the base value is the maximum value in 2006. *Reference year: 2019*	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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, World Economic Forum [Executive Opinion Survey]
Air transport, freight	Volume of freight measured in metric tons times kilometers traveled. *Reference year: 2018*	World Bank [International Civil Aviation Organization, Civil Aviation Statistics of the World and ICAO staff estimates]
Energy infrastructure		
Electricity costs for industrial clients	US$ per kWh *Reference year: 2018*	IMD World Competitiveness Yearbook 2019 [OECD Energy Prices and Taxes 1/2019 (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: 2017*	Calculated by CNI, based on data from CO2 Emissions from Fuel Combustion Highlights (2018 Edition) and the World Bank.
Quality of electricity supply	Electric power transmission and distribution losses as a percentage of output. *Reference year: 2016*	The Global Competitiveness Report 2019, World Economic Forum [International Energy Agency (IEA)]

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
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: 2018*	Global Innovation Index 2019
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: 2018*	Global Innovation Index 2019
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: 2019*	World Bank, Doing Business 2020
Taxation		
Tax burden		
Tax revenue (% of GDP)	Percentage of GDP *Reference year: 2017*	OECD Revenue Statistics (OECD, 2019)
Total tax rate (% of profit)	Total amount of taxes and mandatory contributions owed by companies in their second year in operation, as a percentage of their commercial profit. *Reference year: 2019*	World Bank, Doing Business 2020
Quality of the tax system		
Payments (number per year)	Total number of tax and contribution payments during the year. *Reference year: 2019*	World Bank, Doing Business 2020
Postfiling index	The post filing index is based on four components – time to complete procedures related to refunds of VAT or of the tax on goods and services; time to obtain a refund of VAT or of the tax on goods and services; time to comply with a corporate income tax correction; and the time to complete a corporate income tax correction. *Reference year: 2019*	World Bank, Doing Business 2020

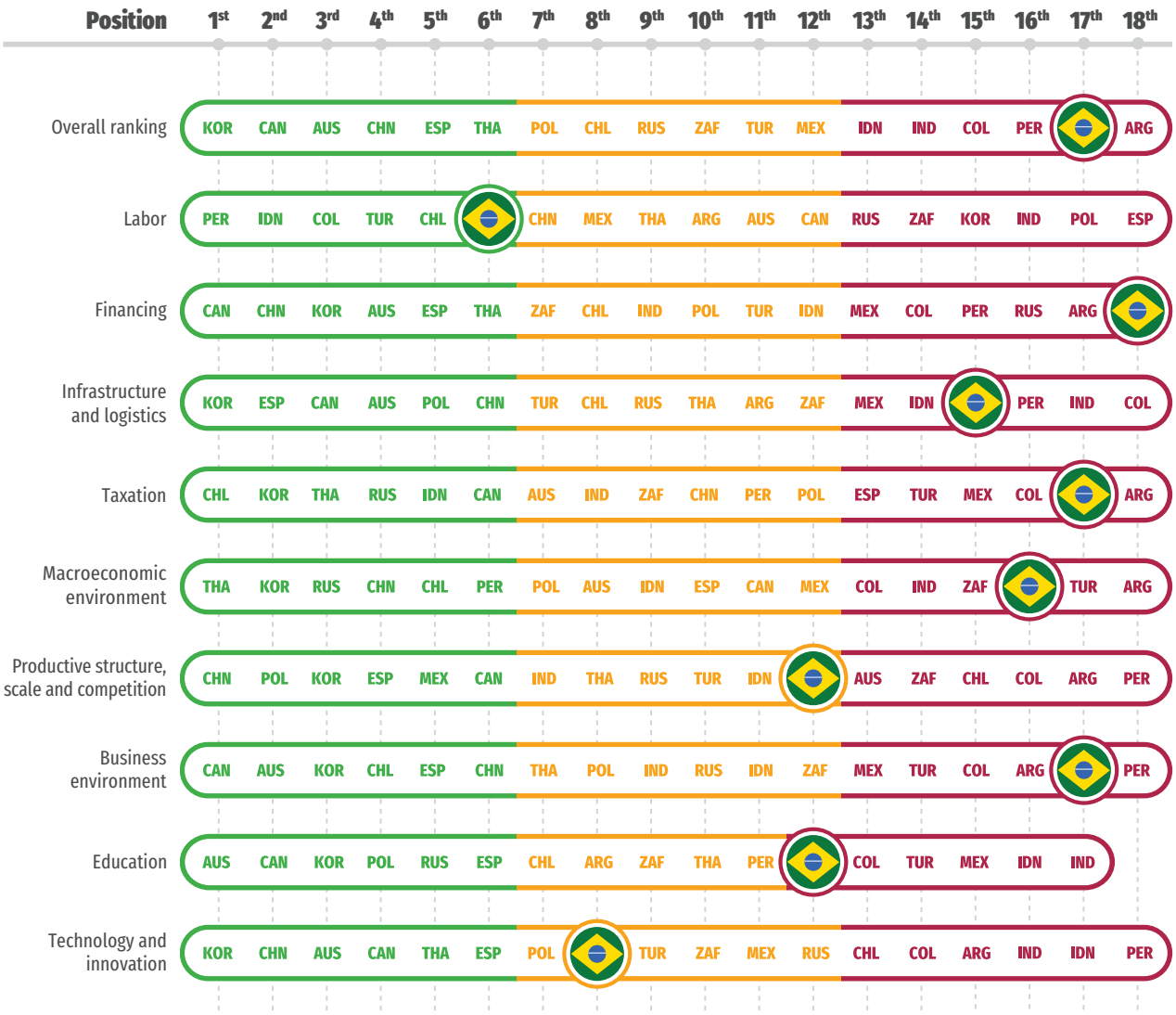
NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Quality of the tax system (cont.)		
Distortive effects of taxes and subsidies on competition	Variable generated from responses to the question: In your country, to what extent do tax measures (subsidies, tax incentives, etc.) distort competition? (1 = they distort competition to a great extent; 7 = they do not distort competition in any way) *Reference year: 2018-2019 (weighted average)*	The Global Competitiveness Report 2019, World Economic Forum
Macroeconomic environment		
Monetary balance		
Inflation rate	Consumer price index - annual variation - percentage *Reference year: 2018*	World Economic Outlook Database, Oct. 2019, IMF
Fiscal balance		
Government gross debt	Gross General Government Debt as a percentage of GDP *Reference year: 2018*	World Economic Outlook Database, Oct. 2019, IMF
General government net debt interest payments	Spending on nominal interest on net government debt, calculated based on the difference between the nominal result and the primary result. Percentage of GDP. *Reference year: 2018*	Calculated by CNI based on data from the World Economic Outlook Database, Oct. 2019, IMF.
External balance		
Current account balance (% of GDP)	Current account balance as a percentage of GDP *Reference year: 2018*	World Economic Outlook Database, Oct. 2019, IMF
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: 2017*	The Atlas of Economic Complexity, Center of International Development at Harvard University
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: 2018*	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: 2018*	The Global Competitiveness Report 2019, 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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, 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: 2018*	The Worldwide Governance Indicators, 2018 Update [Daniel Kaufmann, Natural Resource Governance Institute (NRGI) and Brookings Institution; Aart Kraay, World Bank Development Research Group]

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Government Efficiency (cont.)		
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: 2018*	The Worldwide Governance Indicators, 2019 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: 2019*	Rule of Law Index ® 2019, 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: 2018*	The Worldwide Governance Indicators, 2019 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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, World Economic Forum [Executive Opinion Survey]
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: 2019*	World Bank, Doing Business 2020
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: 2019*	World Bank, Doing Business 2020
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: 2018-2019, weighted average*	The Global Competitiveness Report 2019, 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: 2017*	UNESCO Institute for Statistics. Education: September 2019
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: 2017*	UNESCO Institute for Statistics. Education: September 2019
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: 2018*	OECD: Education at a Glance 2018 *Brazil: CNI estimate, based on data from IBGE (Continuous PNAD).

NAME	DESCRIPTION	SOURCE [ORIGINAL SOURCE]
Educational attainment (cont.)		
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: 2018*	OECD: Education at a Glance 2019. *Brazil: IBGE (Continuous PNAD).
Educational assessment		
Performance in mathematics	Average scores in math tests, 15-year-old students. *Reference year: 2018*	PISA 2018 Results (Volume I): What Students Know and Can Do - OECD 2019
Performance in reading	Average scores in reading tests, 15-year-old students. *Reference year: 2018*	PISA 2018 Results (Volume I): What Students Know and Can Do - OECD 2019
Performance in science	Average scores in science tests, 15-year-old students. *Reference year: 2018*	PISA 2018 Results (Volume I): What Students Know and Can Do - OECD 2019
Expenditure on education		
Total public expenditure on education	Percentage of GDP *Reference year: 2016*	Education at a Glance 2019: OECD Indicators - © OECD 2019
Total public expenditure on education per capita	US$ per capita *Reference year: 2017*	IMD World Competitiveness Yearbook 2019 [UNESCO (http://stats.uis.unesco.org); Eurostat April 2019; fontes nacionais]
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: 2017*	UNESCO Institute for Statistics. Science, technology and innovation: June 2019 *Brazil: the source is MCTI.
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: 2016*	UNESCO Institute for Statistics. Science, technology and innovation: June 2019 *Brazil: the source is MCTI.
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: 2018*	Global Innovation Index 2019
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: 2018*	Global Innovation Index 2019
High-tech exports	High-technology exports minus re-exports (% of total trade) *Reference year: 2017*	Global Innovation Index 2019

APPENDIX C
REVISED 2018-2019 RANKING

FIGURE C1 - REVISED VERSION OF THE PREVIOUS RANKING (2018-2019): COMPETITIVE POSITION OF THE 18 SELECTED COUNTRIES



The country is in the third of countries in a more favorable position (positions 1-6)
The country is in the middle third (positions 7-12)
The country is in the bottom third (positions 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 values recorded by each country in the nine competitiveness factors assessed. For more details, see the methodological note in Appendix A.

LEARN MORE

For more information on the survey, including previous editions and methodology, visit: www.cni.com.br/e_competbrasil

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ECONOMIC INDICATORS CNI

BRAZILIAN NATIONAL CONFEDERATION OF INDUSTRY– CNI

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