

Innovations

Sustainable Development Goals and Their Achievements among BRICS Member Countries: A Study of Some Selected Indicators

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Abstract

*The present research paper makes an attempt to assess the level of achievement of SDGs by BRICS member countries. Five major goals namely; good health & well-being, quality of education, affordable & clean energy, decent work & economic growth and environmental sustainability have been considered to measure the achievement of SDGs by the BRICS member countries. The Sustainable Development Achievement Index has been prepared for the above five major goals. The results show the improvement in the level of achievement of SDGs from 2015 to 2022 however, the level of improvement is not encouraging and a long way has to go. All the BRICS member countries are in need to enhance their pace of effort for realizing the goal. China is expected to achieve the SDGs easily. Russia can also achieve the target with slight improvement in its effort and India and Brazil have to work hard for achieving the SDGs by the year 2030.***Keywords:** Sustainable Development Goals, BRICS, Sustainable Development Achievement Index, Affordable & clean energy, Quality Education, Economic Growth, Ecological Balance

1. Introduction

The General Assembly of the United Nations very successfully negotiated and adopted the Sustainable Development Goals (SDGs) in January 2015 (Bernstein, 2017). There are 17 major goals that are expected to be achieved by 2030 (Fu e al., 2019). These goals are subject to the realization of 169 targets with the help of 247 indicators (Nanda,2015). Since the adoption of these goals, almost half of the period designated to achieve them has passed, which invites evaluation of the achievements made till date to decide the future course of action so that the goals may be achieved within the stipulated time.

In this paper, an attempt is being made to assess the level of achievements perceived under SDGs during 2015 to 2022. Since there are a large number of indicators with which the assessment of the achievements of the SDGs can be done, it is not feasible to include all of them in a research paper. In this research paper, 10 indicators are selected, representing the six major goals of the SDGs. These indicators are: annual GDP growth (in percentage), GDP per person employed at PPP in dollars at a constant price of 2017, the maternal mortality rate (modelled estimate per 100,000 live births), neonatal mortality rate, under-5 mortality rate,forest area (% of land area), total greenhouse gas emissions (kt of CO₂ equivalent), access to electricity (% of population), educational attainment at least bachelors or equivalent lower secondary and primary, population 25+ years in terms of total percentage (cumulative).

Further, it is pertinent to note here that these sustainable goals of the United Nations are supposed to be realized through international and regional cooperation. To addthis aspect of the SDGs, the present study considers the BRICS (Brazil, Russia, India, China, and South Africa) as a regional group cooperating with each other in realizing the SDGs. For the study BRICS has been selected as it includes the rapid growing economies of the world. The selection of the group is also important as it comprises of four major continents of the world. In this way, the present study is based on the achievement analysis of SDGs of BRICS member countries.

2. Literature Review

BRICS constitutes a group of five countries namely, Brazil, Russia, India, China, and South Africa (Guillotín, 2019). Established with the purpose of fostering cultural, economic, political, and commercial cooperation among its members (Mazenda, 2016). This alliance is fundamentally driven by the shared commitment to address pressing socio-economic challenges within their respective countries. These challenges encompass issues such as poverty, sluggish economic growth, inequality, and hunger. South Africa and Brazil have significantly high inequality rates and currently these countries are sitting at 0.69 and 0.59 respectively (OECD, 2019). On the other hand, China, Russia and India have low-income inequality. In line with the income inequality, Rodgers (1983) claims a positive relationship between population growth. BRICS bloc contributes about 30 percent of the world's GDP (World Bank, 2019). This implies that BRICS countries economically compete with the rest of the world such as OECD (Abdou and El Adawy, 2018). Among the BRICS countries, China is the highest contributing country with an average economic growth of 7.1 percent per year, which is above the target of the Sustainable Development Goal at number 8 (United Nations, 2020). India is the second growing economy averaging about 4 percent yearly (Macrotrends, 2020). It is specializing in the ICT sector that tends to boost the economy. On the other hand, Brazil and Russia are the least growing economies among BRICS. Both countries' average economic growth is below 1 percent, which worsens the socio-economic challenges. Sinha et al. (2020) identified that SDGs policies have improved the energy efficiency and possibly generate a positive spillover effect. Harris et al. (2020) emphasized discussing solutions that position health in infrastructure policy by employing an institutional framework to illustrate concepts, rules, and practices. Ligorio et al. (2022) discovered that urban development, environmental issues, cultural impacts on citizens and public management are the trends in the pursuit of sustainable cities and communities in recent years. A number of recent studies have employed systems thinking and analytical methods in examining the Sustainable Development Goals (SDGs) at various levels. These include a global network analysis that

explored interconnections among all SDG targets (Le Blanc, 2015). A regional study that applied network analysis of interlinkages between water-related targets and other SDG targets and assessed critical linkages and leverage points (United Nations Economic and Social Commission for Asia and the Pacific 2016) and the global cross-impact analyses that interlinkages between goals and targets (Coopman et al. 2016; the International Council for Science, 2017). Additionally, a national study that applied system dynamics modeling to explore relationships between energy, health, and education targets (Collste et al., 2017). Other recent studies have utilized sophisticated quantitative spatial and sectoral modeling approaches, to aid in prioritization, target selection, and policy evaluation within the context of the SDGs (Gao and Bryan, 2017; Obersteiner et al. 2016).

3. Methodology

This research paper aims to evaluate the Sustainable Development Achievement of the across BRICS nations, using 11 indicators encompassing annual GDP growth (in percentage), GDP per person employed at PPP in dollars at a constant price of 2017, the maternal mortality rate (modelled estimate per 100,000 live births), neonatal mortality rate, under-5 mortality rate, forest area (% of land area), total greenhouse gas emissions (kt of CO₂ equivalent), access to electricity (% of population), educational attainment at least bachelors or equivalent lower, secondary and primary, population 25+ years in terms of total percentage (cumulative). After the identification of target indicators, the next step involves normalizing the data due to variations in units of measurement (Bolstad et al, 2003). The study used the maximum-minimum normalization method, known for its effectiveness and efficiency. This approach considers both positive and negative features of data, transforming them into a standardized range of 0 to 1 (Wu et al., 2021). The normalization process has been done with the help of the following equations:

For positive indicators

$$Z_{ab}^c = \frac{(Z_{ab}^c - \min Z_{ab}^c)}{\max Z_{ab}^c - \min Z_{ab}^c} \cdot 1$$

For negative indicators

$$Z_{ab}^c = \frac{(\max Z_{ab}^c - Z_{ab}^c)}{\max Z_{ab}^c - \min Z_{ab}^c} \cdot 2$$

Where, a' represents indicators, b' represents Sectors/countries, c' represents years, \max = maximum, \min = minimum and Z_{ab}^c represents the normalized value of each indicators.

After normalizing the indicators through equations 2 and 3, the next step includes computing the Sustainable Development Achievement Index (SDAI). This is done by employing equal weighting methods (Lafortune et al., 2018; Alam et al., 2023), initially on a sector-by-sector basis, followed by a country-wise analysis for BRICS members, and ultimately considering the BRICS group as a whole.

$$SDAI_b = \frac{1}{n} \sum_a^n Z_{ab}^c \quad 3$$

Where, a' represents indicators, b' represents sectors/countries, c' represents years, Z_{ab}^c represents the normalised value of indicators and SDAI represents sustainable development achievement index value of particular country.

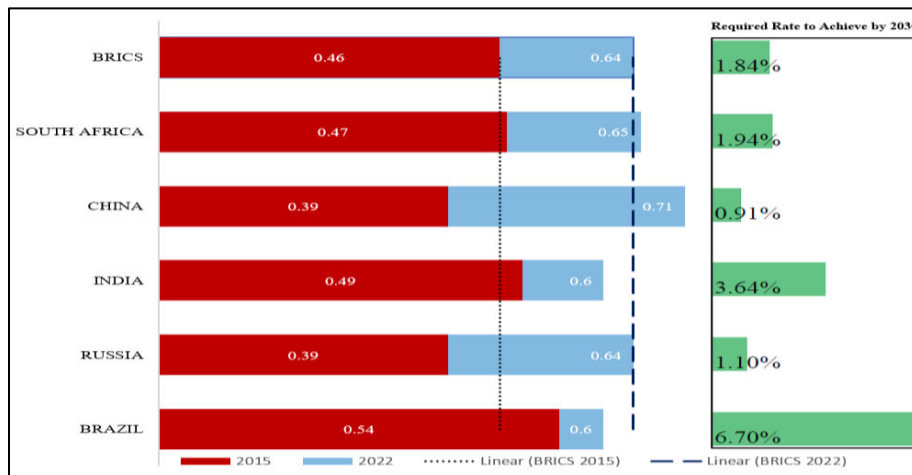
4. Result and Analysis

The achievement index of SDGs is calculated with the help of formula mentioned in the methodology section of the paper. As we know the value ranges between 0 to 1 and as we approach to the value of 1, we approach to the realization of goal, and as these values approaches to zero, we move farther to the realization of the goals. The composite index value for the BRICS member countries is calculated for the two periods namely; 2015 and 2022. The year 2015 is selected to know the status of a country in realization of SDGs when these were set to be realized and to

know the achievements of these countries after 7 years of implementation of SDGs in 2022. The information is provided in figure 1 as under.

It can be observed from the figure that during the 7 years of implementation of SDGs in the selected countries, all of them have achieved improvement in realization of goals. During this period, this regional group has registered a combined improvement by 0.19 points. If this achievement is being compared with the targets to be achieved within the stipulated time of 2030, this regional cooperation group is required to work hard and can achieve the targets only by working at the rate twice than realized in the earlier 7 years of its implementation.

Figure. 1
Country-wise SDGs Achievement Score



Source: Author Calculation based on data available at data.worldbank.org








When we see the performance of the individual member country of BRICS, it can be noticed that the highest level of achievement is registered by China, followed by Russia and South Africa. During the seven years of SDGs implementation, Brazil has the lowest achievement and India has slightly better level of achievement as compared to Brazil among the BRICS member countries.

The present level of achievements of SDGs made by the BRICS member countries reveals that if the countries move on with the same pace as during the 2015-22, none of them is going to realize the goals by 2030 except China. If we consider the achievement level of BRICS during 2015-22 as benchmark effort, BRICS

has to almost double its effort (1.84 times) so as to achieve the SDGs within the stipulated time. To achieve the target, Brazil needs to work hardest and required to work 6.7 times for achieving the SDGs by 2030. India needs to speed up its efforts by 3.64 times to achieve the goals set by UN during the given time period. South Africa is expected to double the efforts for realizing the SDGs by 2030. Russia needs a very minor improvement in its attempt to reach to the desired value of sustainable development achievement index.

The above discussed SDAI is based on realization of five important goals of sustainable development. These are good health and well-being, quality education, affordable and clean energy, decent work and economic growth, and environmental sustainability. The goal of environmental sustainability is proposed by combining two goals of SDGs; Climate action and Life on land. For knowing the area in which these countries need to work, can be find out by evaluating the goal wise achievements by them. The following figure 2 provides us information about goal wise achievements of BRICS member countries.

Figure 2
Country wise performance across SDGs

Goals	3 Good Health & Well-being 	4 Quality Education 	7 Affordable & Clean Energy 	8 Decent Work & Economic Growth 	13&15 Environmental Sustainability 	Composite 2022 	Composite 2015 
Countries							
BRAZIL	0.47	1	1	0.43	0.1	0.6	0.54
RUSSIA	0.27	0.68	0.66	0.96	0.61	0.64	0.39
INDIA	0.04	0.98	0.67	0.93	0.39	0.6	0.49
CHINA	0.01	1	1	0.56	1	0.71	0.39
SOUTH AFRICA	0.35	0.72	0.63	0.87	0.68	0.65	0.47
BRICS	0.23	0.88	0.79	0.75	0.56	0.64	0.46

- Achiever [1]
- Front Runner [0.65- 0.99]
- Performer [0.50- 0.64]
- Aspirant [0– 0.49]

Source: Author Calculation based on data available at data.worldbank.org

Depending upon the value of SDAI for various goals, countries have been divided into four categories namely; achievers (1), front runner (0.65- 0.99), performer (0.50- 0.64) and aspirant (0– 0.49). This categorization is based on the report published by NITI Aayog. As per the value of SDAI for good health and well-being, all the member countries of BRICS are still aspirants even after completion of 7 years of implementation of SDGs. As far as the status of Brazil is concerned, it has proved to be an achiever in terms of realizing the goal of quality education and affordable & clean energy. It has come out as performer in 2022, because of poor achievement in remaining three goals. In these three goal, still the country is an aspirant and needs to work in these areas.

Russia being a performer in 2022, is front runner in achieving the goal of quality education, affordable & clean energy and decent work & economic growth. The SDAI values for these goals show that they are achievable but needs to concentrate on realizing the goal of environmental sustainability and required hard work to achieve the goal of good health and well-being where the country is an aspirant. India being a performer in 2022 from an aspirant in 2015 has presented its metal in realizing the goal of quality education, affordable & clean energy and decent work & economic growth. In terms of all these goals, India has been performer. It needs special attention towards the goals of attaining environmental sustainability and particularly good health & well-being as it is an aspirant in this area.

China, a front runner in terms of achieving the SDGs in 2022, is an achiever in terms of three major goals; quality education, affordable & clean energy and environmental sustainability. However, this country is a performer in realizing the goal of decent work & economic growth and an aspirant with very low SDAI value for good health & well-being which can be a cause of concern for the country. South

Africa is also a front runner country in realizing the SDGs in 2022 from an aspirant in 2015. It is also a front runner with good SDAI value for quality education, decent work & economic growth and environmental sustainability and expected to achieve the goals by 2030. This country needs to work on achieving the goal of affordable & clean energy where it is a performer. This country is in need of special attention towards improving the medical facilities so as to achieve the goal of good health & well-being as it is an aspirant in this field.

Overall, BRICS as a regional cooperation group can perform well in realizing the SDGs during the stipulated time. During the 7 years of implementation of SDGs, this regional cooperation group has come out from an aspirant in 2015 to a performer in 2022. In terms of three major goals (quality education, affordable & clean energy and decent work and economic growth) this group of the countries has improved to the category of front runner and a good push can make it achiever in these goals. This group of countries has a minor improvement in environmental sustainability and ask for holistic planning so that the goal may be achieved during the given time. But a major cause of concern for the BRICS, is realizing the goal of good health & well-being where all member countries are falling under the category of aspirants. This gives an urgent call for some strategic planning based on the cooperation of each and every member country.

Conclusion

From the SDAI values of BRICS member countries, it can be perceived that all of them were aspirants at the time of implementation of the SDGs in 2015. Over the 7 years of SDGs implementation, China and South Africa have hardly manage to reach to the position of front runner and remaining countries have just improved to the level of performer. BRICS as a regional cooperation group has hardly improved to the level of performer in 2022 from aspirant in 2015 that shows its poor level of achievement of SDGs. The gap between present status and the place to achieve is so high that BRICS has to make twice effort than it had made during the seven years of SDGs implementation. Only China and Russia are expected to achieve the goal of

SDGs by stipulated time of 2030 by moving with the same pace as they have achieved during the last seven years. To achieve SDGs, South Africa has to double its effort and India is bound to enhance its pace of efforts by more than 3.5 times as made between 2015 to 2022. For Brazil, achieving the SDGs seems to be a distant dream and it has to increase its effort by 6.7 times of earlier period.

The area in which all these countries are supposed to work hard is realization of good health & well-being. Another area which needs special attention is maintenance of environmental sustainability. In this area, Brazil and India are still aspirants and Russia is a performer. These countries are expected to realize the 4th goal i.e., quality education more easily as compared to other goals. With slightly better effort, the goal of affordable & clean energy can also be achieved because two countries namely Brazil and China are achievers and Russia and India are front runner.

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