Belt and Road - A Determination of its Success in Countries in Global Communities

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ABSTRACT

The Belt and Road Initiative (BRI) launched by China in 2013 aims to improve global connectivity, facilitate trade, and promote economic growth. While the BRI has seen success in many member countries, some countries have experienced limited benefits. This research paper explores the factors contributing to the success or failure of the BRI in different countries. Drawing from existing literature, we identify transparency, debt sustainability, environmental standards improvement, adoption of social safety nets, and labor mobility as key factors influencing the BRI's outcomes. We analyze data from selected BRI countries, including Cuba, Chile, Gabon, Portugal, Oman, and Libya, to assess the impact of these factors. Transparency is measured using the HRV index, debt sustainability using the GDP-Debt Ratio, environmental standards improvement using the Air Pollution Exposure Index, adoption of social safety nets using healthcare expenditure as a percentage of GDP, and labor mobility using data from the International Labor Organization. Additionally, we examine the GDP per capita as an economic status indicator. Our findings reveal variations in the success of the BRI across different countries, with factors such as transparency, debt sustainability, and environmental standards playing significant roles. The research provides insights into the complex dynamics of the BRI and offers valuable recommendations for improving its effectiveness in member countries.

Introduction

The Belt and Road Initiative (BRI) is an infrastructural project launched by China (People’s Republic of China) in 2013. Proposed by Xi Jinping, the trillion-dollar initiative is also commonly referred to as One Belt, One Road or the Modern Silk Road due to its resemblance to the ancient Chinese program near 138 BC. Similar to the Silk Roads, the BRI stretched across Europe, Asia, Africa, etc. However, the BRI has a much broader range in terms of spheres of influence, also expanding into countries in/like Australia, South America, New Zealand, Central America, etc. The main purpose of developing such a vast and influential project is to facilitate trade, improve global connectivity, bolster economic growth, and encourage regional consolidation. While the BRI has proven to be highly successful in the 146 active member countries currently held under its influence, there are some cases in which the BRI has proven not to be as impactful. This research paper dives into the specifics of why certain countries benefit under the BRI and a determination of their success.

Literature Review

There have been a few sources addressing the factors that contribute to BRI implications. In a fairly recent paper by World Bank (2019), they conclude that “it must be accompanied by deep policy reforms that increase transparency, improve debt sustainability, and mitigate environmental, social, and corruption risks.” These deep policy reforms, according to the World Bank, would help foster and expedite economic progress in developing countries to assist in reducing their poverty. Furthermore, Caroline Freund, the World Bank’s Director for Macroeconomics, Trade, and
Investment, commented on the topic by observing that “BRI’s success depends on the implementation of policy measures in three broad categories: transparency, country-specific gaps, and multilateral cooperation” as well as “Greater transparency is necessary at all levels, from project planning to budgeting and procurement and public reporting of debt levels. For countries to benefit fully from BRI, they will need to work together. In addition, many countries need to strengthen environmental standards, adopt social safety nets, and improve labor mobility.” Utilizing both the claims from the World Bank and Caroline Freund, this research paper will dive into the true impact the factors (a country’s transparency, debt sustainability, environmental standards improvement, adoption of social safety nets, and improvement of labor mobility) have on the success rate of BRI implementations on the countries of the world. In addition to testing the applicability of these factors to various BRI member countries to test if they hold true, this paper will also use the economic status factor (GDP per Capita) to measure the level of impact the BRI had on various economies and measure the impact of the 5 factors listed above.

Methods & Data

To start off, we must define how each factor is to be defined as per our standards in this research. The first factor - transparency - is to be measured through the HRV index, a measure formulated by James R. Hollyer, B. Peter Rondorf and James Raymond Vreeland. The HRV index hones in on one specific aspect of transparency: the communication of national data to international organizations. This aspect is so important to consider for transparency as it allows for governments to objectively assess a country’s true economic situation. In addition, there will be no impartiality and by sharing this data, countries will have more opportunities to help improve their overall economies. The data for this aspect is measured from 1980-2010, so some conclusion is needed to apply it across the current time period as well. However, a general trend is all that is necessary to determine its true validity to BRI projects. A general trend is adequate to determine true validity as data is highly limited for this measurement (applied to this specific aspect) and also it is a trend that has shown its value for over 30 years from 1980-2010, so it can be a safe bet to apply this trend to the current scenario and counteract the unavailability of more current data.

The second aspect to be defined is debt sustainability, which is to be measured through the GDP-Debt Ratio. It will cover how a country’s public debt compares to the economic success of the country. To analyze this aspect, we need to identify that if a country’s GDP-Debt Ratio is above 77%, it is to be considered not debt-sustainable. Vice Versa, if a country has a GDP-Debt Ratio of below 77%, it is to be debt-sustainable as the higher the GDP-debt ratio goes, the more the country is borrowing than actually outputting. The benchmark of 77% percent was established due to a 2013 study by the World Bank, who indicated “A 2013 study by the World Bank found that if the debt-to-GDP ratio exceeds 77% for an extended period, it slows economic growth. Every percentage point of debt above this level costs the country 0.017 percentage points in economic growth.” Therefore, it is safe to say that due to this being a valid study, we can apply the 77% threshold to our study as a cutoff.

The third aspect to be defined is the improvement of a country’s environmental standards, which is to be measured through the Air Pollution Exposure Index. This index is a combination of two different subcategories, combined into one measurement. The Air and GHG emissions and the Air pollution exposure are two indicators of data that this paper has taken to determine environmental standards improvement. If the country has an Air and GHG measurement (in the year of admittance into BRI) of more than 5 CO2 tons per capita and an Air pollution exposure measurement (in the year of admittance into BRI) of more than 15 Micrograms per cubic meter of fine particulate matter, then that country is considered to have degrading environmental standards. On the other hand, if a country has less than 5 tons of CO2 and less than 15 Micrograms per cubic meter, that country will be considered to have improved environmental standards. The threshold of 5 Tons is established as relative to the average energy related carbon footprint per capita. This is indicated by Laura Cozzi, Olivia Chen, and Hyeji Kim in their article “The world’s top 1% of emitters produce over 1000 times more CO2 than the bottom 1%.” In this article, it is mentioned that “Meanwhile, the global average energy-related carbon footprint is around 4.7 tons of CO2 per person.” Instead of using a precise measure like 4.7, there has been a decision to round that number off to 5 Tons instead to compensate for slight margins
for countries and borderline values. Therefore, if we apply this metric to our own study, we can state that a value above the average global energy (in our case - 5 Tons) related footprint is considered degrading. Meanwhile for the 12 Micrograms, the New York State Department of Health released an article describing the EPA’s thresholds for human health protection. In the article, “Fine Particles (PM 2.5) Questions and Answers,” they indicate that the “long-term standard (annual average) is 12 µg/m³.” This metric refers to the micrograms of fine particulate matter per cubic meter. Due to 12 being a relatively sound and whole number, we can simply just keep this value.

The fourth aspect to be defined is adoption of social safety nets, which is to be measured through a measure of the % of the GDP used towards social welfare spending, which we will consider healthcare for the specific measure. The current health expenditure (measured in %) as outlined by the World Bank is an appropriate measure. For this research, we will consider anything above a 5% to be considered acceptable use of social safety nets/proper adoption, while anything below a 5% will be considered unacceptable use of social safety nets/improper adoption. The 5% threshold came from a 2007 study called “What Should A Country Spend On Healthcare.” The paper describes that “The paper also addresses a commonly cited World Health Organization statement that countries should spend 5 percent of national income on health care services.” With this existing data, we can utilize 5% as our social safety net measure.

The fifth aspect to be defined is the improvement of labor mobility, which is to be measured through the ILOSTAT’s (International Labor Organization Statistics) data on the distribution of labor migrants based on subregions of the world. Using those statistics, we can adjust them to fit our research purposes by describing anything below 7% will be considered to not have as good of labor mobility as the regions with a percentage of higher than 7%. 7% is an acceptable threshold as in the graph below, the graph is split roughly halfway between above 7% and below 7%.

The economic status impact factor needed to be defined is the GDP per Capita factor. This factor is used to determine if the 5 true factors above had a significant impact on the country enjoying success from the BRI’s initiatives and implementations. The GDP per Capita factor is a good measure/indicator of economic growth as according to Investopedia’s article, “GDP Per Capita Defined: Applications and Highest Per Country,” it is indicated that “There are a few ways to analyze a country’s wealth and prosperity. GDP per capita is the most universal because its components are regularly tracked on a global scale, providing ease of calculation and usage.” Therefore, it is a good and
representative metric of measuring the impact of the factors on an economic scale. The GDP per capita factor is to be measured through the rate provided by the World Bank’s database. We will look at the GDP per Capita before the country joined the BRI conglomeration with the GDP per Capita after the country has went through some BRI initiatives (basically the year after they joined the BRI to see if the growth rate was positive (meaning a strong, positive correlation between the 5 factors and the BRI success) or if the growth rate was negative (meaning a weak, negative correlation between the 5 factors and the BRI success). The before value will be the year the country actually joined the BRI and the after value will be 2021 (most recent value provided in World Bank database) to see sustained growth in the economy and GDP per Capita.

To begin the actual research, we must select BRI countries from around the world in order to be distributive and representative. Some specifics need to be detailed for the actual interpretation of the factors and their applicability to the countries.

The transparency value, measured on the HRV index, displays a general trend from 1980-2010, with upper, central, and lower bound estimates. We will be using the trend displayed by the data to apply it to the time of the BRI era in that specific country. If all three values (relative change) are negative or at least 2 of the three, we can say it did not pass that category and vice versa.

Also, for measuring the GDP-Debt Ratio (to measure debt sustainability), we use the value for the year the country joined the BRI. For example, if Cuba joined the BRI in 2019, then we would use the GDP-Debt Ratio of Cuba in 2019 to measure the debt sustainability then.

Next, for the Air Quality Index, we are to use the air quality measurement (GHG and fine particulate matter exposure) for that country relatively near the time that they joined the BRI. For example, if a country joined the BRI in 2019, we would look at air quality of GHG and exposure values in 2019.

The social safety net measurements are going to also come from the year that the country joined the BRI. For the labor mobility measurement, we are taking region measurements from 2019, as it is relatively close for all the countries’ entry dates into the BRI.

Also, if some factors of the five factors are successful (meaning they pan out and display a correlation to our guidelines set), while others do not, then we will consider a country to be successfully following the factors if three out of the five factors are successfully met. The countries chosen for this research study include Cuba, Chile, Gabon, Portugal, Oman, and Libya. Cuba joined in 2019, Chile joined in 2018, Gabon joined in 2018, Portugal joined in 2018, Oman joined in 2018, and Libya joined in 2018. Now we have to start assessing and applying our factors to these five countries.

First off is Cuba. Cuba, on the HRV index, has an upper bound relative change index of -7%, a central estimate change index of -4%, and a lower bound relative change index of -1%. Due to all values being in the negative range, we can consider Cuba to not pass the transparency category. Cuba recorded a GDP-Debt Ratio of 19% in 2019, making it lower than the threshold for debt-sustainability, which indicates a passing category for this section. It is an indication of gaining more than losing. Cuba, on the Air Quality Index, recorded an Air and GHG measurement of 2.1 and an Air fine particulate exposure measurement of 17.95, making it fairly environmentally suitable as one of the two factors was fulfilled. As recorded by the World Bank, Cuba, in 2019, spent 11.19% of the total GDP on healthcare, advocating a strong safety net for the country. Cuba, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 3.5% for the Latin America and the Caribbean subregion, placing it as one of the regions without good labor mobility.

Chile on the HRV index, has an upper bound relative change index of +179%, a central estimate change index of +142%, and a lower bound relative change index of +120%. Due to all values being in the positive range, we can consider Chile to pass the transparency category. Chile recorded a GDP-Debt Ratio of 25.6% in 2018, making it lower than the threshold for debt-sustainability. Chile, on the Air Quality Index, recorded an Air and GHG measurement of 4.57 and an Air fine particulate exposure measurement of 23.64, making it fairly environmentally suitable due to one of the two factors being met. As recorded by the World Bank, Chile, in 2018, spent 9.16% of the total GDP
on healthcare, advocating a strong safety net for the country. Cuba, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 3.5% for the Latin America and the Caribbean subregion, placing it as one of the regions without good labor mobility.

Gabon, on the HRV index, has an upper bound relative change index of -730%, a central estimate change index of -637%, and a lower bound relative change index of -278%. Due to all values being in the negative range, we can consider Gabon to not pass the transparency category. Gabon recorded a GDP-Debt Ratio of 60.9% in 2019, making it lower than the acceptable threshold for debt-sustainability. Gabon, on the Air Quality Index, recorded an Air and GHG measurement of 1.16 and an Air fine particulate exposure measurement of 37.55, making it fairly environmentally suitable as one of the two factors were met. As recorded by the World Bank, Gabon, in 2018, spent 2.75% of the total GDP on healthcare, advocating a weak safety net for the country. Gabon, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 7.4% for the Sub Saharan African subregion, placing it as one of the regions with good labor mobility.

Portugal, on the HRV index, has an upper bound relative change index of 307%, a central estimate change index of 256%, and a lower bound relative change index of 232%. Due to all values being in the positive range, we can consider Portugal to pass the transparency category. Portugal recorded a GDP-Debt Ratio of 121.5% in 2018, making it higher than the acceptable threshold for debt-sustainability. This indicates a bad turnout for Portugal and it is considered to not pass this category. Portugal, on the Air Quality Index, recorded an Air and GHG measurement of 4.59 and an Air fine particulate exposure measurement of 8.22, making it environmentally suitable. As recorded by the World Bank, Portugal, in 2019, spent 9.41% of the total GDP on healthcare, advocating a strong safety net for the country. Cuba, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 242% for the Northern, Southern, and Western subregion, placing it as one of the regions with good labor mobility.

Oman, on the HRV index, has an upper bound relative change index of -4%, a central estimate change index of -10%, and a lower bound relative change index of -21%. Due to all values being in the negative range, we can consider Oman to not pass the transparency category. Oman recorded a GDP-Debt Ratio of 44% in 2017, making it lower than the threshold for debt-sustainability. Oman, on the Air Quality Index, recorded an Air and GHG measurement of 14.23 and an Air fine particulate exposure measurement of 44.02, making it not environmentally suitable. As recorded by the World Bank, Oman, in 2017, spent 3.69% of the total GDP on healthcare, not advocating a strong safety net for the country. Oman, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 5.6% for the Central and Western Asia subregion, placing it as one of the regions without good labor mobility.

Libya, on the HRV index, has an upper bound relative change index of -1%, a central estimate change index of -2%, and a lower bound relative change index of -3%. Due to all values being in the negative range, we can consider Libya to not pass the transparency category. Libya recorded a GDP-Debt Ratio of 105% in 2018, making it higher than the acceptable threshold for debt-sustainability. Libya, on the Air Quality Index, recorded an Air and GHG measurement of 6.68 and an Air fine particulate exposure measurement of 36.38, making it not environmentally suitable. As recorded by the World Bank, Libya, in 2011, spent 6.05% of the total GDP on healthcare, advocating a strong safety net for the country. However, this value is from 2011 and not the year that Libya joined, therefore it must be noted that Libya prior to 2018, has had a positive growing trend, spending more on healthcare year after year. Therefore, it is a reasonable conclusion to make that Libya will have more than 5% of its GDP spent on healthcare for the year 2018 (the year it joined the BRI). Libya, as outlined in the ILOSTAT database for distribution of international migrant workers for subregions, recorded a value of 0.7% for the Northern Africa subregion, placing it as one of the regions with good labor mobility.
Table 1

<table>
<thead>
<tr>
<th>Country</th>
<th>Transparency</th>
<th>Debt-Sustainability</th>
<th>Environmental Standards</th>
<th>Social Safety Nets</th>
<th>Labor Mobility</th>
<th>Predicted Success or Failure of the BRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuba</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>Chile</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>Gabon</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Success</td>
</tr>
<tr>
<td>Portugal</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Success</td>
</tr>
<tr>
<td>Oman</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Failure</td>
</tr>
<tr>
<td>Libya</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Failure</td>
</tr>
</tbody>
</table>

Results & Conclusion

As outlined by the chart above, the different categories are applied to the 5 countries. Cuba has passed 3 out of the 5 requirements we set out, so therefore we can make an educated prediction that Cuba will have significant success when adopting BRI measures/policies. Similarly, the other 3 countries (Chile, Gabon, Portugal,) are also looking to experience success as they have passed the majority of the categories we set out for potential success. On the other hand, the other 2 countries (Oman, Libya) are looking to not experience success as they have not passed the majority of the categories set out for potential success. Now we compare these results to what has happened to these countries after it has joined the BRI. As stated before in our methods section, we used the GDP per Capita economic factor as an indicator of economic growth for these 5 countries as a result of the 5 factors (transparency, debt sustainability, etc.). To prove that the predicted success as seen in the table above was actually accurate, this GDP per Capita measured was utilized. If there was an improvement in the GDP per Capita, we can say that the country has experienced economic growth because of passing the 5 factors in the table above. Table 2 is shown below.

Table 2

<table>
<thead>
<tr>
<th>Country</th>
<th>Year Joined Value (year before)</th>
<th>2021 Value (Year After)</th>
<th>Improvement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuba</td>
<td>$9,139.4</td>
<td>$9,499.6</td>
<td>Yes by $360.2</td>
</tr>
<tr>
<td>Chile</td>
<td>$15,795.7</td>
<td>$16,265.1</td>
<td>Yes by $469.4</td>
</tr>
<tr>
<td>Gabon</td>
<td>$7,694.9</td>
<td>$8,635.3</td>
<td>Yes by $940.9</td>
</tr>
<tr>
<td>Portugal</td>
<td>$23,562.6</td>
<td>$24,567.5</td>
<td>Yes by $1,004.9</td>
</tr>
<tr>
<td>Oman</td>
<td>$19,887.6</td>
<td>$19,509.5</td>
<td>No reduced by $378.1</td>
</tr>
<tr>
<td>Libya</td>
<td>$11,838</td>
<td>$6,357.2</td>
<td>No reduced by $5,480.8</td>
</tr>
</tbody>
</table>
In all, our study took the factors of a country’s transparency, debt sustainability, environmental standards improvement, adoption of social safety nets, and improvement of labor mobility to test a country’s success when joining the BRI conglomerations and implementing its policies into their economies. The 5 countries that we put to the test were all determined to have predicted success and then later backed up by the GDP per Capita to determine that these countries were in fact actual successes with the BRI. In other words, the 5 factors as seen in Table 1 were used to predict a potential success of the BRI in those countries, while the data in Table 2 confirmed the success of the BRI in those countries. This meant that our way of determining our data was proven and is therefore accurate by these standards. These five factors were chosen to be studied in this research as a previous study conducted by the World Bank, “Success of China’s Belt & Road Initiative Depends on Deep Policy Reforms, Study Finds,” describes that “The study, by a team of World Bank Group economists led by Michele Ruta, found that complementary policy reforms will be essential for countries to unlock BRI-related gains. Real income for BRI economies could be two to four times larger if trade facilitation is improved and trade restrictions are reduced. In addition, stronger labor-mobility and adjustment policies would ensure that gains are more equally shared.” This indicates that the five factors that were chosen were chosen because of addressing the needs of the countries in the BRI to succeed. These factors were needed to show why and how the countries would benefit and what exactly the BRI country conglomerations needed to do and implement to be successful. This research can be transformed using different economic factors or different countries and it can even be used to determine why countries fail in the BRI as opposed to our paper examining success. Overall, it is important to remember to use a representative sample of countries from all over the global community and use fair factors to fully capture the true data that is needed to prove your hypothesis.

**Discussion**

This research paper examined the five factors that we believed were some of the main causes of a BRI member country to either fail or succeed under BRI policies. The selected 6 countries (Cuba, Chile, Gabon, Portugal, Oman, and Libya) all provide evidence on how a country could either succeed or fail under these factors and predictions provided by them. Transparency is a significant factor in determining BRI success, along with debt sustainability, environmental standards, adoption of social safety nets, and labor mobility. The analysis of the HRV index displays that a negative relative change shows a lack in transparency, in turn, causing a hindrance in that country receiving the true benefits of the BRI. The lack of transparency can also lead to problems in effectively dealing with the budget, planning protocols, and more, so it is important to have strong transparency levels to have a good economy which can benefit from the BRI. The GDP-Debt Ratio analysis, measuring debt sustainability, identifies those countries with low debt levels, as opposed to countries with high debt levels, will experience a higher chance/likelihood of succeeding with the BRI. The debt of the countries must be maintained properly and not let out of control to ensure economic stability and growth. Environmental standards, measured through air pollution exposure and greenhouse gas emissions, also play a big role in determining the success of BRI countries. The countries with lower air pollution index values and lower greenhouse gas emissions indicate a more positive, higher likelihood of success. These standards are significant for a more sustainable development for a country and strengthening them will only help a country face more BRI success. The adoption of social safety nets, which was seen through healthcare spending, is another big factor. The countries which tend to allocate a higher percent of their Gross Domestic Product (GDP) to the country’s healthcare needs, will tend to indicate better social safety net adoption. This, in turn, will reap significant benefits for the country from the BRI’s socioeconomic developmental programs. Labor mobility, measured through labor migrant distribution, influences BRI success as well. Countries with a higher percentage of labor mobility show a stronger connection to BRI success, as migrant workers are able to move and work with far more ease in these countries. Countries below the threshold, however, show limits with worker movements and cannot fully capitalize on their true benefits. The GDP per capita, as an economic status indicator, indicates further insights to how impactful the 5 factors above were in changing the country’s economy. Through a comparison of a GDP per capita before and after the country joined the BRI (after - 2021), it is possible to point out correlations between BRI success and the factors indicated above. By
addressing the factors above, countries will do well to maximize their chances of BRI success and gain the full benefits from the massive economic project, as well promote sustainable development of both itself and the world.

**Limitations**

While this research paper provides significant evidence and insights into success criteria and factors for BRI development in the countries we have chosen, it is also crucial to note and point out certain limitations that may affect the paper’s generalizability. First off, the study was limited to studying 6 countries effectively, which have all joined the BRI between the years of 2018-2019. The countries were specifically chosen to ensure regional diversity and global representation. However, due to only 6 countries being chosen, further studies can be conducted to increase the sample size of countries studied and choose different dates of BRI entry, in order to study and make the study more generalized. In addition, the data used for the factors may also have limits. For example, the data have been taken at specific points to study these countries specifically. In addition, the HRV index was also applicable up until 2010, and a trend was needed to apply it to our standards of research. Using more updated and comprehensive data would provide more accurate results to today’s standards of study. There would and could be other variables to study that could also show BRI success through different means. Those factors were not studied in this paper, but can be studied in future papers, to account for the whole. By addressing these limitations and more, researchers in the future can provide a more knowledgeable study with their more advanced technology and research methods.

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