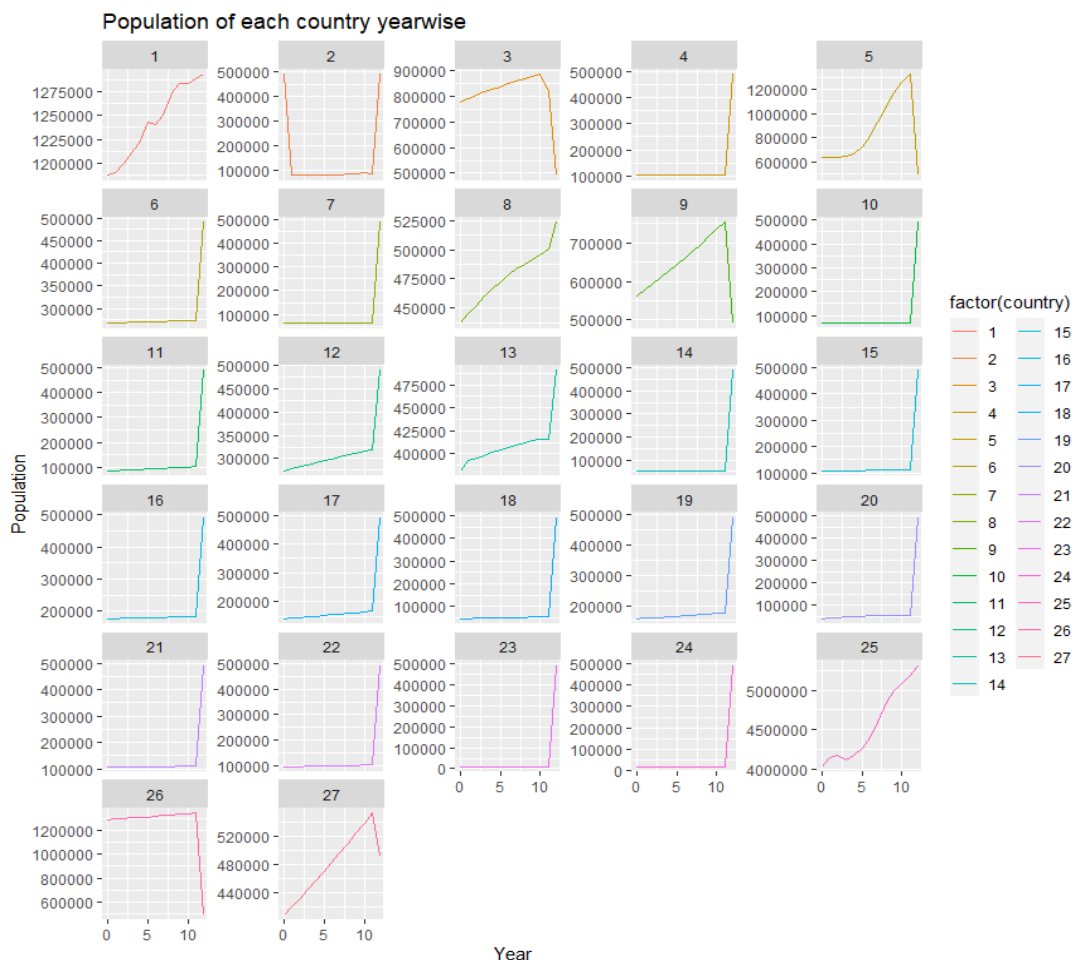


Data Visualization and Exploratory Analysis Project

Part -1

Initially, I would be exploring and analyzing the entire dataset i.e. how tourism has affected all the countries, and then later I would exclusively focus on the importance of tourism in pacific island nations(PIC). I have mostly used line plots and bar plots as they help in showing the increase and decrease in the various attributes of the dataset. I have kept the x-axis as years as a constant and varied the y axis accordingly how I require. I have represented countries in different colors as that would help in the clear understanding of the graph that is being depicted i.e. the relationship between x and y axes for different countries. In the dataset provided only country and year are categorical data whereas the rest of the data is continuous. For pre-processing the dataset, I first replaced all the missing values with NA and then dealt with the NA's by replacing them with the mean of the column.

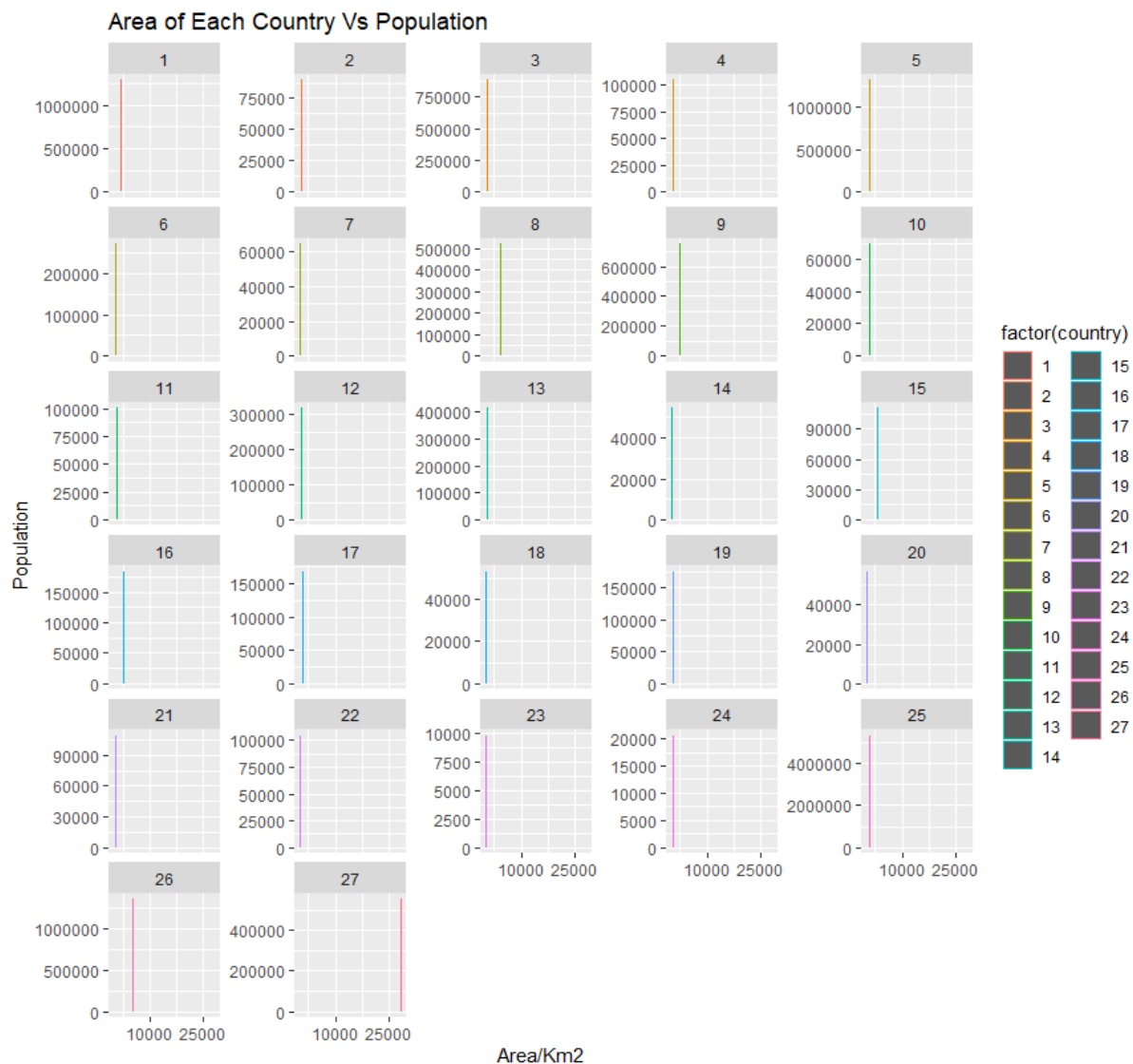
1. Plot of Population Vs Country Year wise



From the above plot, it is very clear that the population of most of the countries has increased by some margin and for some countries, there has been a decline in the population has then increased over the years. The country which is indexed 25 has had the largest increase in terms of population. The reason for this might be because of the area of the country or because of migrants from different countries arriving in that particular country. There are also countries whose population has increased and then suddenly decreased after a certain period which is very strange. These are countries like the Solomon Islands(27) and Comoros(9). Also, there are countries whose population has remained constant for some years, and then the population has increased. Also, have a look at Maldives(12), the population was very small in 2000 when it was below 300K and in 2012 the population is above 450K. So that means there have been more international arrivals in the Maldives which would result in higher tourism receipts.

There are few countries whose population growth is very minimal which might also be because of the size of the country. Next, we will look at how does the size of the country affects the population of the country and does it have any effect on the population of the country.

2. Country Vs Area/Km2

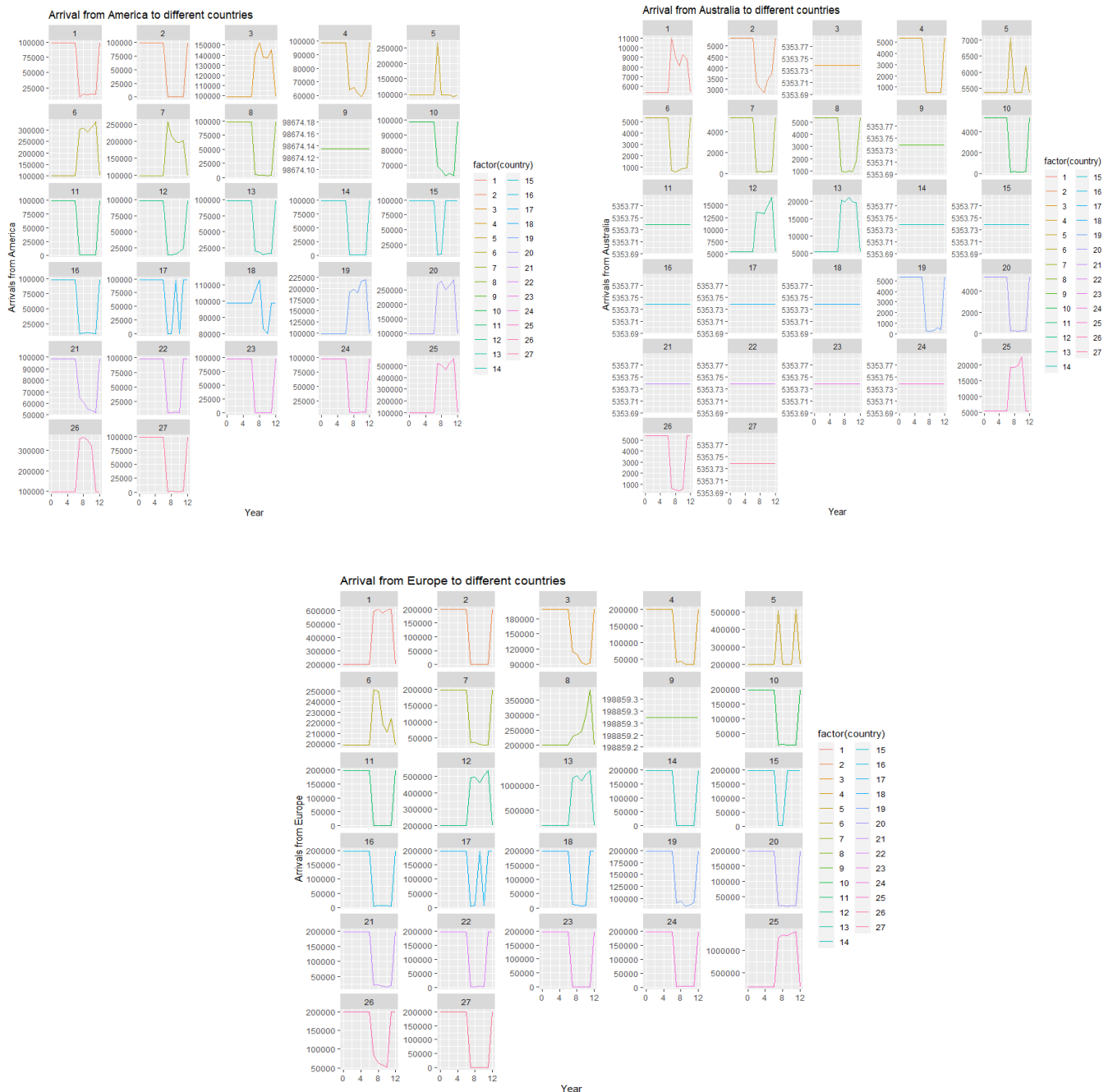


In the previous plot, we saw that country 25 i.e. Singapore had the largest population but we could not figure out the reason for it and we assumed that one reason might be the area of the country. In the above figure, we plot the Area/km2 of each country to analyze the reason for the increase in population. We see an interesting fact in the above figure, area/km2 is not the reason for the increase in population as Singapore is one of the smallest in terms of area but has the highest population and we also see that country 27 i.e. Solomon Islands which has a very small population but is the largest in terms of area and has an area above 25000.

We can observe one more thing, the Maldives area is only about 400Km2 but the population is pretty high for such a small area. This leads us to question what is there in the Maldives that attracts most of the tourists.

Also, Area for any country does change over the years and it remains the same. So we can clearly say that area is not at all affecting population. Now that area/km2 is ruled out as the factor affecting the population, what could be the reason for it then? Is it the arrivals from America, Australia, or Europe affecting the population then?

3. Arrivals from Australia, America, and Europe



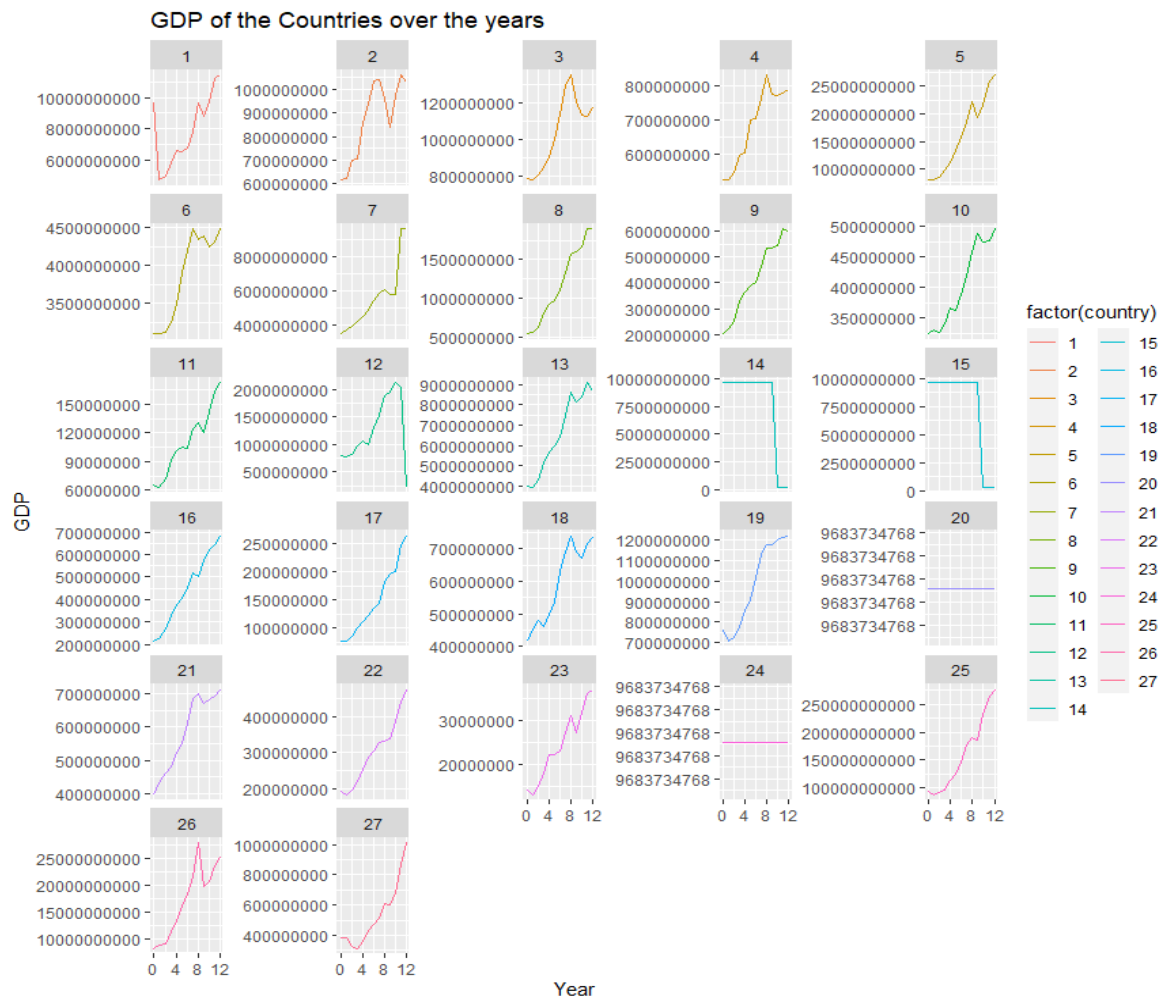
Until now we have tried to find the reason for the increase in population in different countries. The above three figures give a clear description of the number of arrivals from different countries mainly

America, Australia, and Europe. We already know that the population is the highest in Singapore and from the above graphs we can surely say it is because of the arrivals from different countries. Overall, Singapore has had the highest number of arrivals from the countries and hence the increase in population.

Previously we also discussed that the Maldives had a huge increase in margins in terms of the population from 2000 to 2012 and we assumed that it is because of tourists' arrival. But in the above graphs, we see that visitors from Europe have represented almost 70% of total arrivals in 2009 and there is a sudden decrease in the number of arrivals after 2009. The number of arrivals from America and Australia has been pretty low in the Maldives and the highest is at about 100000 and 15K respectively. Why is there a sudden decline in the number of arrivals from Europe and Australia after 2009?

We can also see that almost all the countries have changed in the number of arrivals into the country has either increased or decreased as the years have gone by. But we can also look at one more thing which is strange, the arrivals to some countries from Australia, America, Europe have been constant over the years. Especially the arrivals from Australia in certain countries has been constant. Does that mean these arrivals are not tourists? Are they immigrants who have settled in those countries? Now that we know that the increase in population is because of the immigrants, the question now is why are the arrivals from those three countries so large in Singapore. Why have more tourists preferred Singapore over other countries? Also, are the Arrivals day visits or overnight visits?

4. GDP of different countries over the years



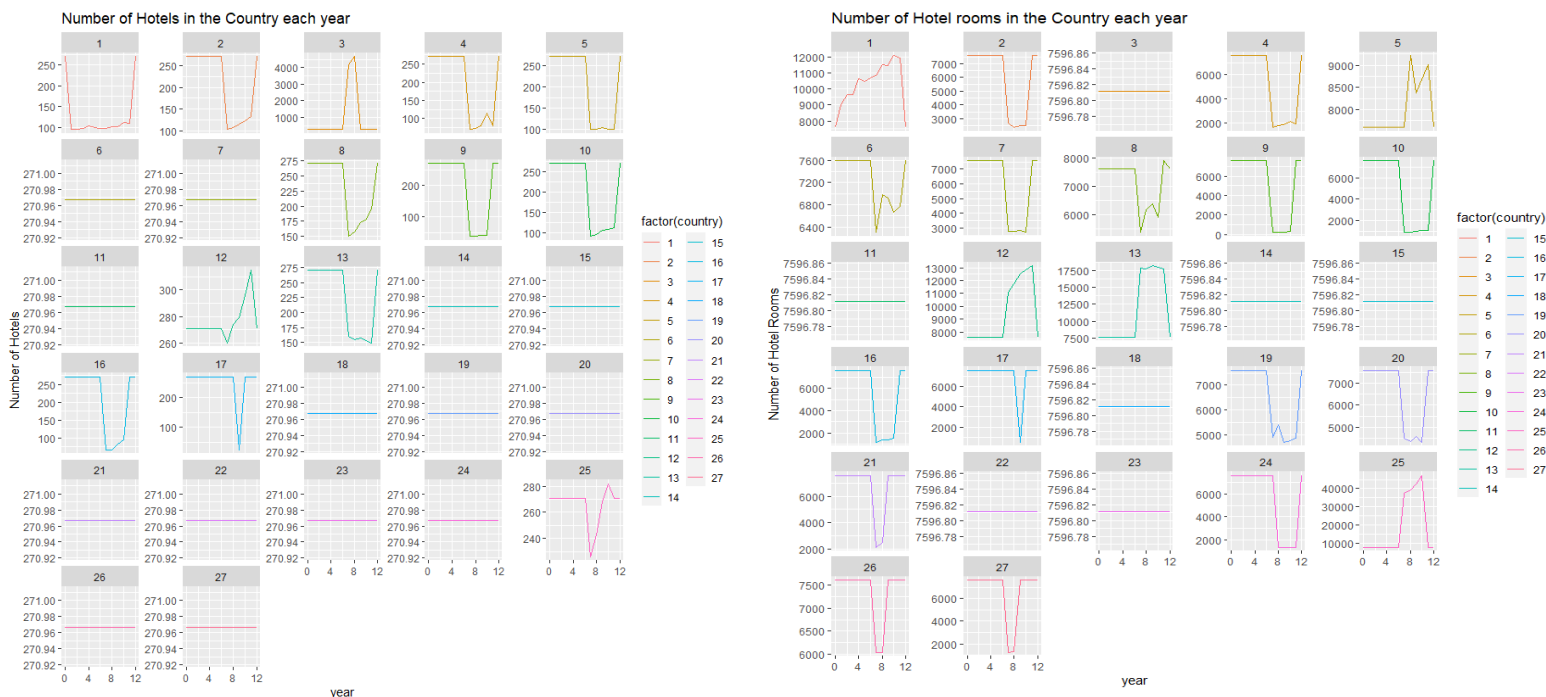
Above is the plot of GDP of different countries over the years. Overall we can see that the GDP of most countries has increased over the years and only a few countries have had a decrease in the GDP and there is only one country whose GDP has been constant over the years. While the increase in GDP over the years is a good sign, a decrease in the GDP is not. Now the question arises, What could be the reason for the decrease in their GDP. Is the lack of tourist places in the country the main reason for the decrease in GDP? Are there not many tourists arriving in these countries?

In the previous plot, we could see that the arrivals from Australia and Europe after 2009 have decreased in the Maldives and that has resulted in the decrease in the GDP of the country which can be seen in this graph. The Maldives is known for its tourism is one of the places for tourists and if the number of tourists arriving has decreased, it means that the GDP will also decrease i.e. by 2012 the GDP has decreased to the least over the years.

Whereas for the countries that have had an initial decrease and then increase in the number of tourist arrivals has resulted in decrease GDP and increase in GDP as the number of tourists has increased which can be seen for Mauritius(1). From these discussions, we can say that tourism has had some impact on

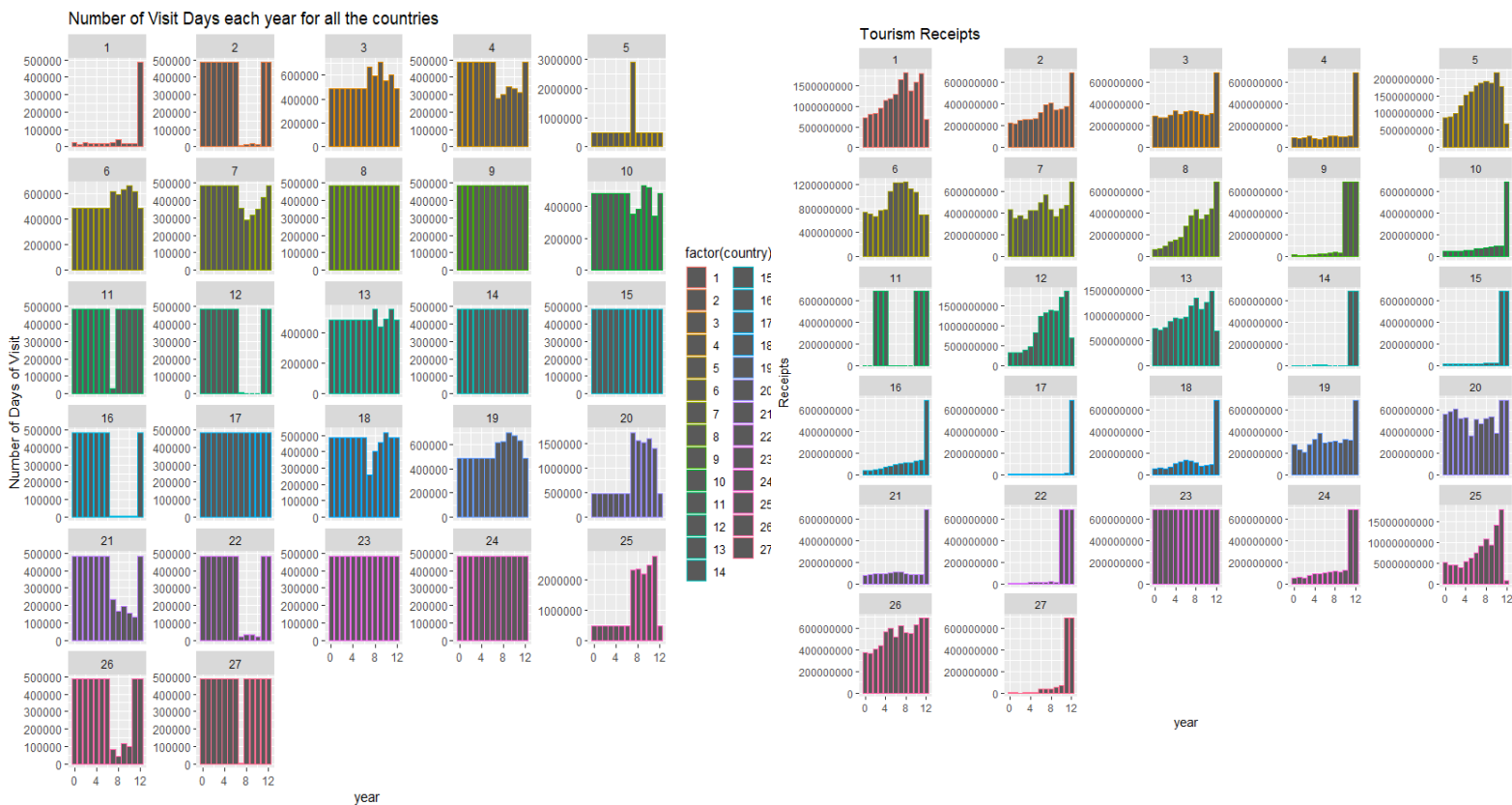
the GDP of the country. Can the number of hotels in the country be a cause of concern for the visitors? Next, we will look at that visualization.

5. Number of Hotels and the Number of Hotel Rooms in the Countries



From the Above 2 figures, we can see that there are a lot of countries that have had a constant number of hotels over the years. Some countries have had an initial increase and then have decreased in the number of hotels in the country. However, in those countries that have a constant number of hotels, it is not the same when it comes to the number of hotel rooms which is pretty understandable as some hotels might have more rooms than the other in that country and hence the number of hotel rooms need not be a constant. But we can also see that for some countries where the number of hotels has been constant over the years, the number of hotel rooms has also been a constant over the years. For example, look at Kiribati(11) in both the graphs are constant. Kiribati is one of the PIC which we will explore later on. When we look at the Maldives here as well the pattern is the same until 2009 there are a good number of hotels and the number of hotel rooms but after 2009 there is a decline in the number of hotels and hotel rooms. The reason for this is still unknown. While tourism could be one factor that Is responsible for the effect on GDP. It does not mean that it is the only reason.

6. Number of Visit Days and Tourism Receipts



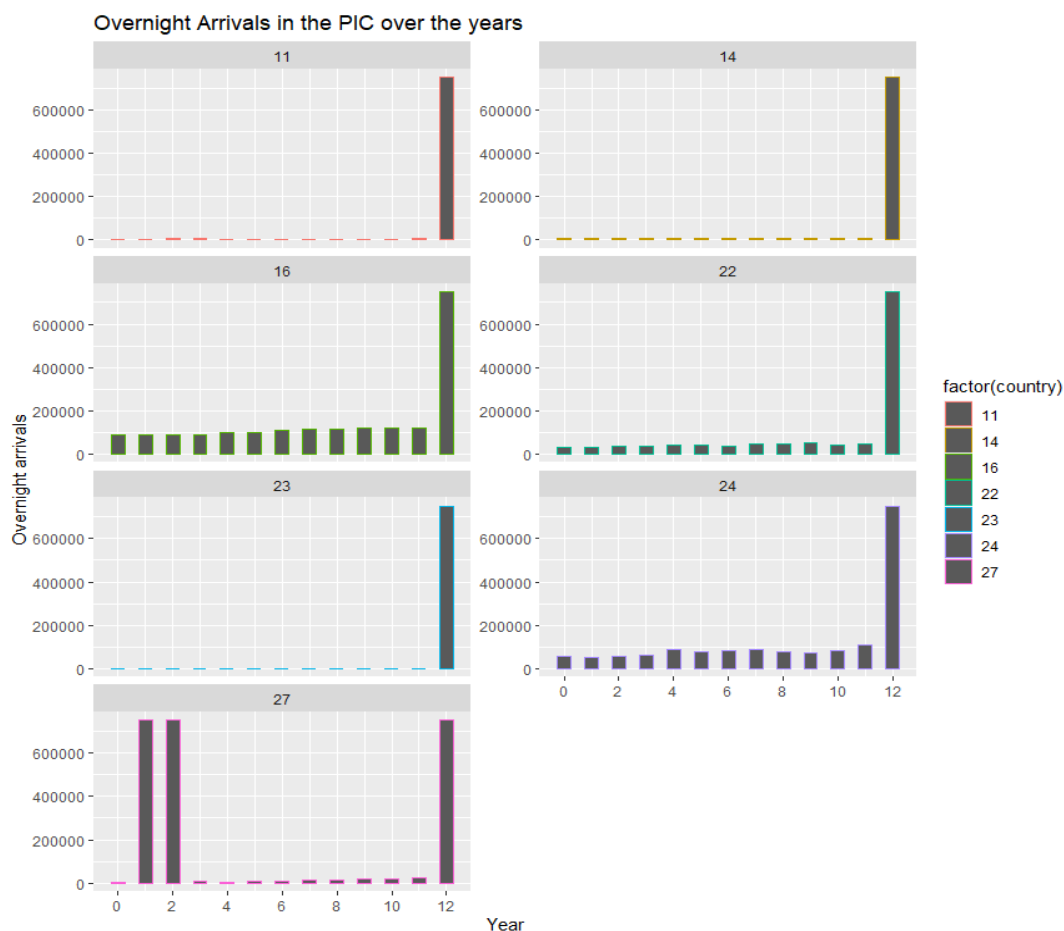
Tourism Receipts are the expenditure that international bound visitors make which includes their payments to national carriers for international transport. This also includes any other payments or payments afterward made for goods and services received in the destination country. As the number of visitors increases the receipts of the country also increase. From the graph, it can be seen that for almost all countries there has been increasing in the receipts as the visitors increased. The number of days of the visit is also an important criterion because the more the number of visit days, the higher will be the receipts. Receipts can also improve the GDP of the country. It is pretty clear though the number of days of visit over the years or in one particular year might be small the receipts will still be pretty high for that particular year. E.g., countries like Mauritius(1), Solomon Islands(27) have had an increase in the number of arrivals in the country which has increased Tourism Receipts and GDP. A higher number of visit days will mean the tourists will be paying more for the hotels, rooms, and various other services which would add up to the receipts. For some countries, the number of visit days by the tourists has been constant over the years.

When we look at the Maldives in this, the number of visits to the country has drastically reduced after 2005 and there is a huge gap in the number of visits from 2005 to 2010 and from 2010 there is again

increase in the number of visit days but this does not affect the receipts in this period. Even though the number of visit days is pretty low from 2005-2010, the tourism receipts are pretty fine.

Until now we have seen how tourism can affect the population and GDP of the countries over the 12 years. We have discussed and found out that hotels, hotel rooms, days of the visit, and receipts might affect the GDP of different countries. After this, we will concentrate on the Pacific Island countries. Also, from all the above graphs we have seen a pattern for the Maldives, let us try and find the reason for the particular.

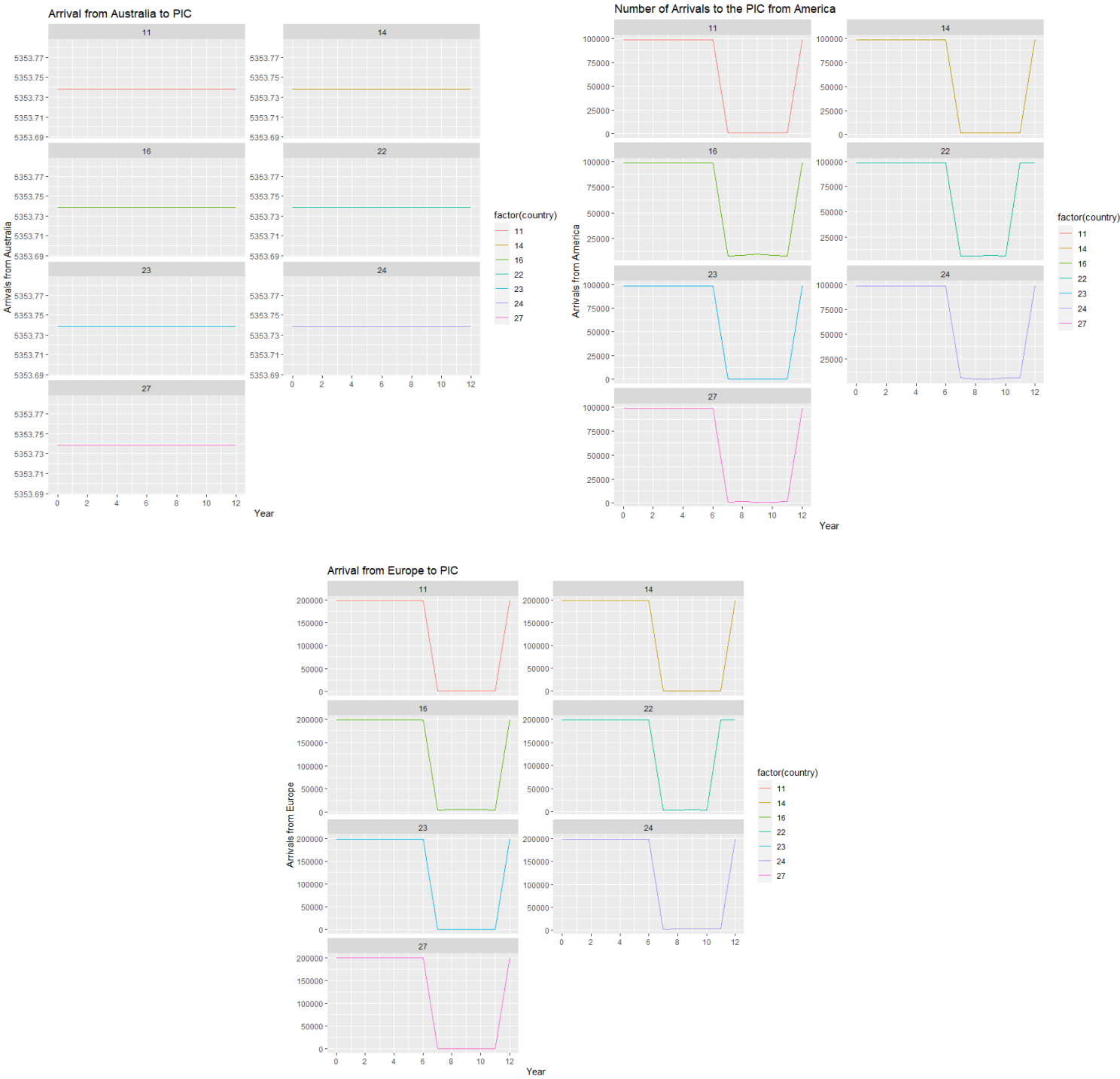
Importance of Tourism in Pacific Island Countries



Solomon Islands(27), Tonga(22), Samoa(16), Kiribati(11), Palau(24), Marshall Islands(14), and Tuvalu(23) are now called the Pacific Islands Countries. The PIC has received about 600K overnight arrivals in 2012 which is a record number. The popular destinations in terms of visitors over the years are Palau(24), Samoa(16), Tonga(22), Solomon Islands(27), Marshall Islands(14), and Kiribati. The visitor arrivals have increased by a large margin from 2000 to 2012. Now that we know the number

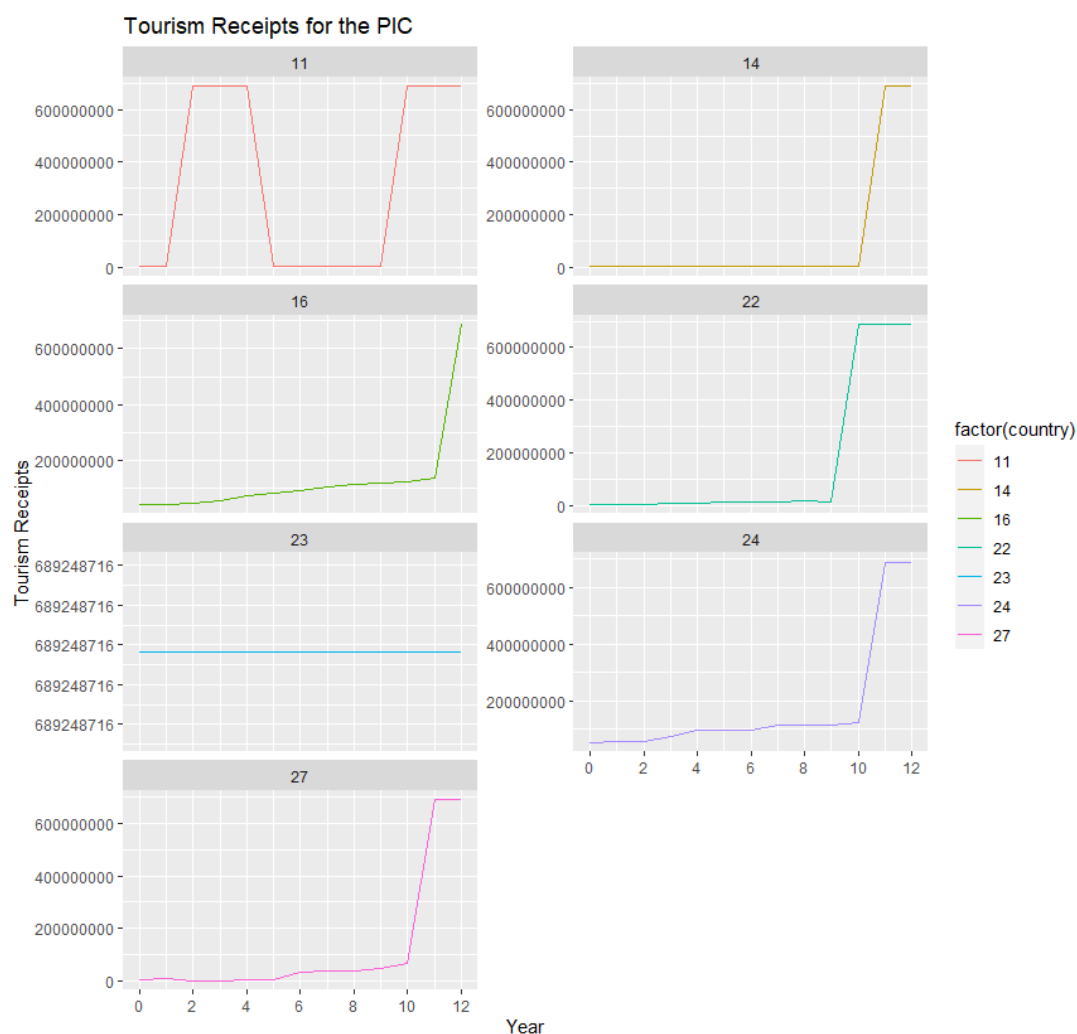
of overnight arrivals to the country has been high. From which country has the arrivals been mostly, Is it from America or Australia or Europe.

Arrivals from Australia or America or Europe



For all the PIC the majority of the visitors have been from Europe and America, Europe being the majority. The arrivals from Australia have been constant over the years which is very strange. Compared to the growth in the arrivals of other countries, PIC's average annual growth has been around 4.5 percent. Is it because people from Australia have preferred visiting other countries than the PIC? Or is it because there is any problem with the data? It surely looks like a data error or is it because of something like a data collection error. Next, we will look at how Tourism plays an important role in the economies of the PIC i.e. how it affects the GDP.

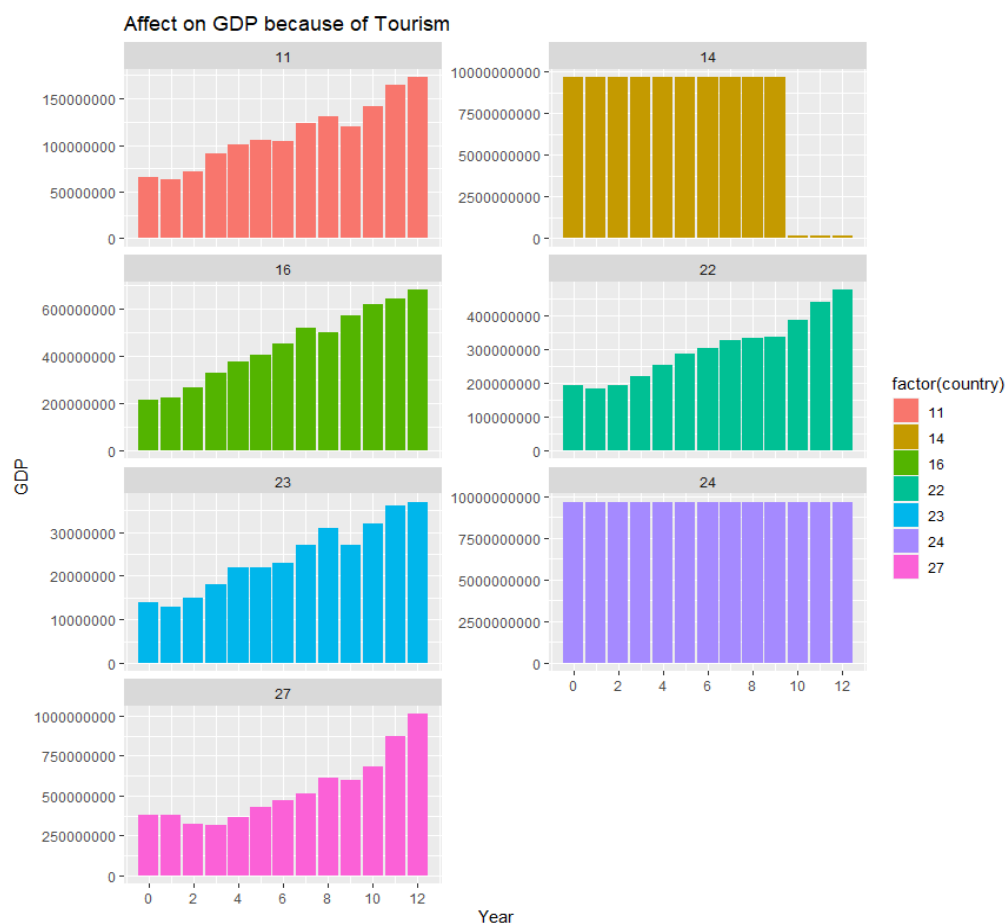
Tourism Receipt for the PIC



The average tourism receipts for the PIC in 2000 were below 200 Million and the average tourism receipts of the PIC in 2012 were above 600 Million. This means that tourism is an important factor for the PIC and plays an important role in the economies as well. Even though these countries are pretty small and very remote, the environment of these countries might be the main tourist

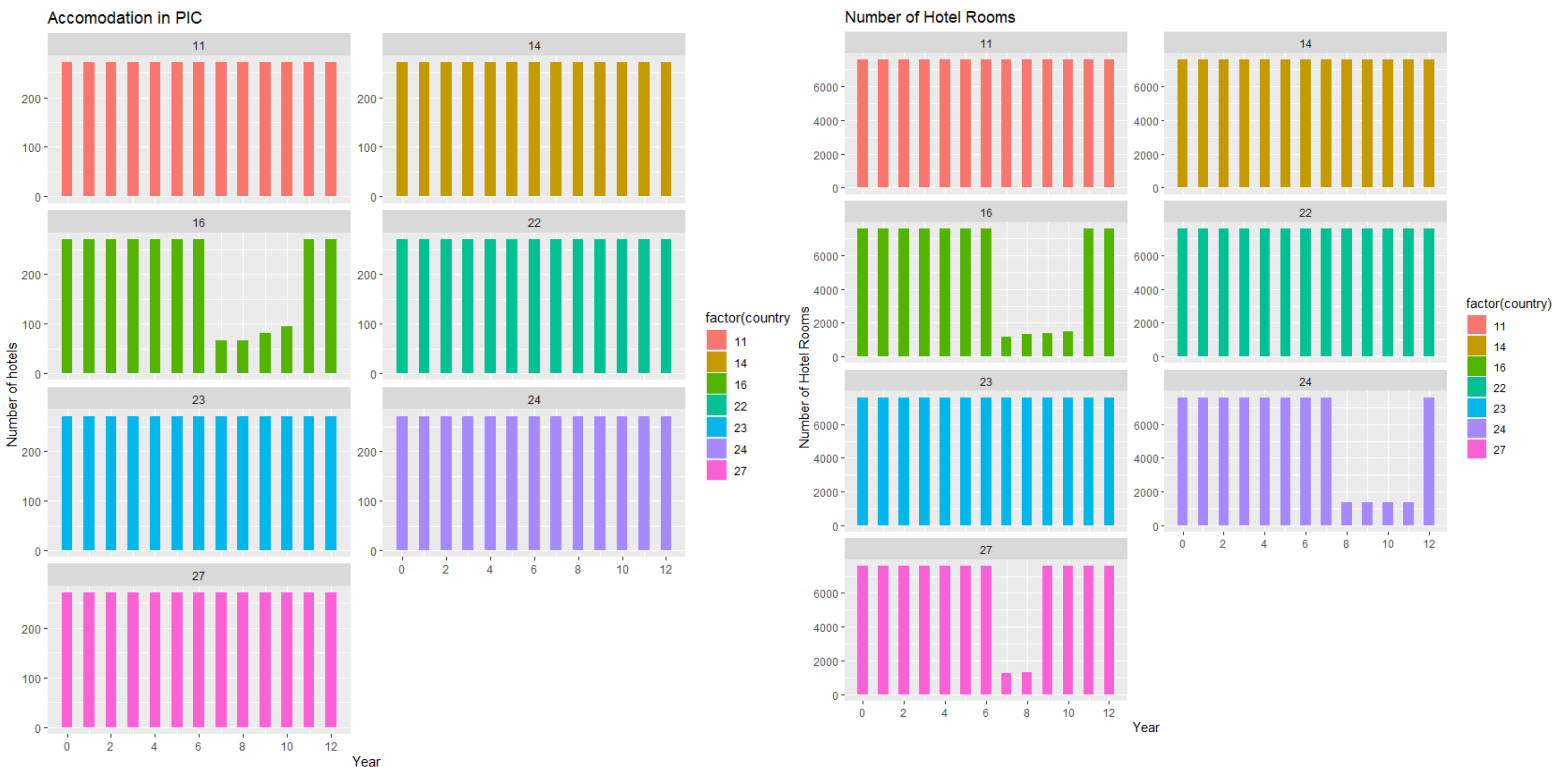
attractions. While the other islands that are competing can also have natural environments and are not exclusive to the PIC, cultural diversity could be the difference. In Tuvalu(23) the receipts have remained constant and it can again be a mistake during the collection of data. Whereas for all the other PIC's the receipts has gradually increased over the years as the number of visitors has also increased. Above I have mentioned some of the reasons that I think are responsible for the increase in the number of visitors increasing the tourism receipts.

GDP of the PIC over the Years



The tourism share of GDP reflects the sector's relative importance in an economy. Between 2000 to 2012 Tonga(22), Tuvalu(23), and Solomon Islands(27) have seen a share of the increase in GDP because of tourism. Kiribati(11) and Samoa(16) have seen almost a double increase in GDP. For Marshall islands, we can see that there is a decrease in GDP from 2009 to 2012. This might be because the Marshall Islands has less developed tourism assets and there might not be tourist activities as compared to the other PIC. If there are not any tourist activities then the number of tourists also decreases. Does the number of hotels and rooms in a region affect the tourists?

Accommodation in PIC



From the graph, we can see that the number of hotels in the PIC is pretty low and just about 400 hotels. Whereas the number of rooms in the PIC is above 6000 and it could also be that not all the hotels would be carrying an international brand. If they're not many international brand names then this would limit the recognition in the international market. If the hotels are not internationally recognized then the number of international visitors might also decrease and luckily that has not been the case until now. Even if there aren't many international branded hotels, the region of the hotels i.e. the location that the hotels are situated in will matter as to how far are tourism spots in the country and the commuting problems from that location.

Questions that I would like to ask

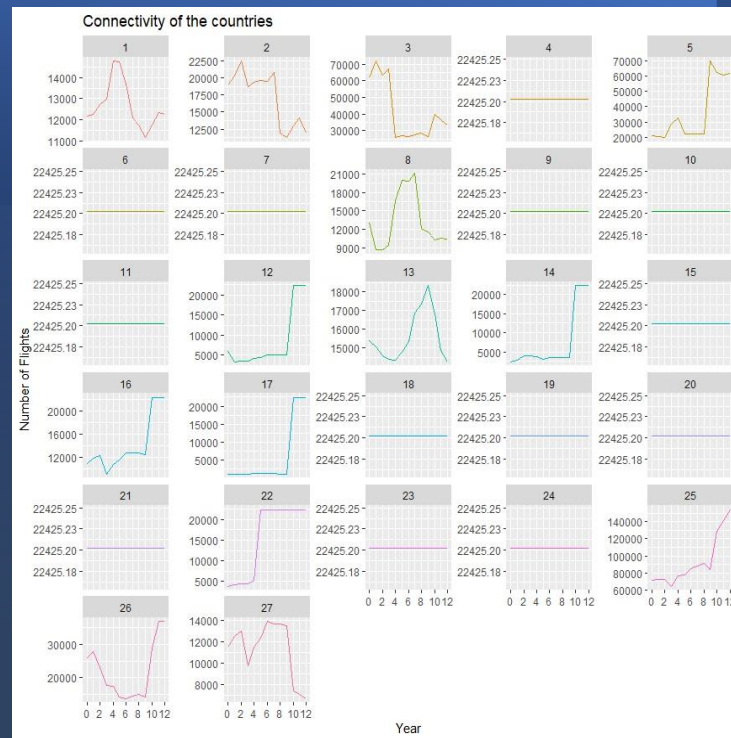
- Why is there a decrease in the number of visitors to the Maldives even though there are a lot of hotels and hotel rooms? Especially after 2009?
- Is there a decrease in the Number of visitors to certain countries because of the global financial crisis?
- Why are the tourism receipts a constant in Tuvalu(23) even though we have seen that there are international visits to that country? Is it a problem with the data collection or is there any other reason?

- Are there any international branded hotels in any of the PIC countries?
- What are the tourist activities provided in any of the PIC countries which has attracted more international visit even though the area of these countries are pretty small?
- How do you improve the efficiency of tourism for countries that have had a decrease in their GDP to deliver higher returns to the governments and communities?
- How to make yourself internationally recognized as a country?
- Can there be an issue in the visa process that has led to the decrease in the number of international visits to the Maldives which was doing very well as the hub for tourists until 2009?
- How do you overcome the dependence of all the 27 island nations on Europe, America, and Australia?

Conclusion

Tourism has transformed many emerging countries in the past 12 years and it would continue to do so. It has had huge impacts in making the country internationally recognized and improved the economy of the country as well. For example, the Maldives and The Pacific Island Countries that many did not know about have been recognized and it is mainly because of tourism, services, and the activities offered there. The market of all these countries largely depends on tourism and we have seen that above. This can increase further if these countries do not depend only on visitors from Europe, America, or Australia. There has to be an improvement in the tourism sector for the countries such as the Marshall Islands(14) which is still being developed. The connectivity to the country must be improved. The linkages between food supplies and services to the hotels must also be maintained. Implementation of some tourism strategy that is already in place for the Maldives, something of that sort might help the developing countries in terms of the tourist sector. Finally, only improving the tourism sector will not help, one should take care of improving the shopping commodities as well.

Part – 2



The visualization on the left persuades us to understand the issues with the decrease in the number of visitors to different countries. Until now we tried to visualize and tried to understand why has there been a decrease in the number of international visits for some countries.

From this plot, connectivity can be the major reason why international tourists have decreased. The connectivity to most of the countries is bad. I.e. The number of flights to and from the country is not that great and the numbers are at the lower half than what they are supposed to be. For some of the countries, the graph shows there is a decrease in the number of flights. Also, for about 8 countries, there hasn't been any increase or decrease in the number of flights i.e., the number of flights has been constant. It is not that the connectivity is not improving, it is improving but just increasing the number of flights year by year does not make sense. There needs to be opening of some new routes and some new services. Try using chartered flights, experimenting with the different types of flights can also be a solution. The control of traffic in the airports also needs to be improved. The cost of the flights also should not be that high at the beginning even before tourism has been established. Depending on the services, time and all the factors, the prices of the flights should be decided.