Understanding the travel and tourism patterns in our interconnected world

Bidusha Poudyal, Zoe Wolszon, Devin Zhang
Massachusetts Institute of Technology (MIT), Course 6.894, Spring 2020

1 INTRODUCTION

We live in a world that is not just connected by technology and communication, but also by travel. The outbreak and rapid spread of the novel Coronavirus has caused many of us to miss the days when we could travel. It has reminded us that our world is more interconnected than ever before, and that the global tourism industry has impacts that go far beyond leisure travel; it carries significant upsides and downsides, with implications for local, national, and global economies, equity, sustainability, and security (especially biosecurity and cybersecurity). The global tourism industry has been specifically recognized as having the potential to support certain Sustainable Development Goals (numbers 8, 12, and 14), "for its capacity to contribute to achieving the SDGs, namely by fostering economic growth, creating jobs, promoting local culture and accelerating the change to more sustainable consumption and production patterns, among others underscoring the integral role of tourism in our societies"[1].

Given this, we were motivated to understand just how much the global tourism industry has grown over the past 25 years, and what have been some of the driving factors in that growth. This event and policy-driven perspective may enable governments and other stakeholders to take a data-driven approach to both understanding the potential impact the travel standstill may have on their economy and ways that other countries have invested and achieved recoveries after similar events (such as the MERS outbreak in 2015 in Korea). Thus, this visualization aims to balance global macro-level trends with individual country-level stories that dig into specific events, government policies, and driving factors to provide context for these trends and anecdotes to inform policymakers and other stakeholders.

2 RELATED WORK

Much of the related work focuses on high-level statistical models, projections, and/or visualizations of macro-level global tourism trends. For example, Statista maintains global tourism industry forecasts, including revised expectations given the COVID pandemic, and visualizes them on a simple bar chart [2]. Forbes has taken a

look at which countries are most vulnerable to the effects of the COVID pandemic as determined by tourism as a percent of their GDP; it is notable that the USA is #6 on that list [3]. However, these visualizations are high-level, static, and brief; they are unable to capture the attention of either individual travelers or government and industry stakeholders who would be most able to utilize the information.

There are a couple of student projects that have explored similar datasets using tools such as Tableau Public, but often all that is available now are static images on websites that discuss the work, and none provide country-specific context on key events or governmental policy. Similarly, the site Howmuch.net put together an interesting visualization of tourism expenditures by country by resizing countries and coloring by region, which can be seen below. However, the visualization is static, non-interactive, only covers a single year, and provides no context.
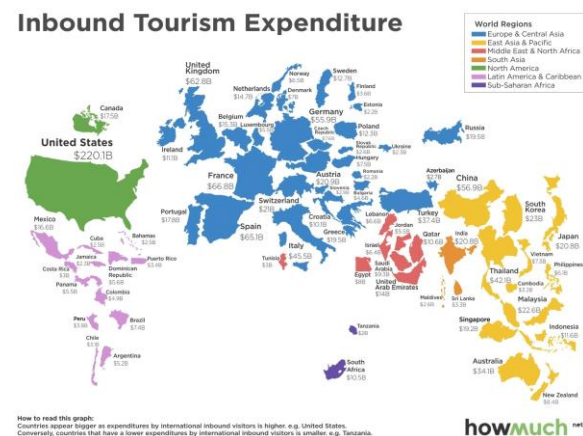

Figure 1: Inbound Tourism Experience [4]

Finally, the closest in many ways is the Our World in Data page on tourism, which has an interactive global map and high-level area chart trends on a similar timescale, but without any guidance for the user, context, or interesting storylines. Like many of the others referenced here, it is likely not a captivating experience for the average user, and can be overwhelming for readers who would like to engage but aren't sure where to start [5].

Thus, we endeavored to create an interactive visualization that allows individuals to both explore macro trends, zoom in on a couple countries that hold interesting learnings for governmental action, and then enable self-guided exploration of trends in individual countries.

3 METHODS

We wanted to weave data and visualization into a narrative tailored to provide a compelling insight on the impact of government initiatives on travel and tourism. It was important for us to tell a story and provide the necessary context and deeper information to engage the audience in our project. We also needed to ensure a right balance between guided and user-directed interaction to eliminate cognitive load from a wide audience while keeping them intrigued.

To accomplish these objectives, we implemented multiple modes of interaction. The initial focus was on narrative storytelling of high-level macro trends. We implemented the world map and embedded bubbles – the location and size of which depicted the country and the number of incoming tourists. We chose to visualize the change in tourist number over time by changing the size of the bubbles. We believe that this form of visualization is relatively easy to track as opposed to changing colors in a heatmap which has the potential to distort perception if the color intensity is not selected properly.

Following that, we chose to show the international tourism for the top 25 tourist destinations with a stacked area chart. The motivation was to display the evolution of the tourism industry in these 25 countries of the same graphics and to highlight any common trends. We were able to observe a pattern of decreased tourism during the 9/11 attack and the 2008 financial crisis.

We then highlight the story of two countries – Korea and USA – with interesting trends in the data that could clearly be tied back to specific events and/or government policies. The idea is to provide specific actionable contents, particularly for individuals in government, the tourism board, and/or other private corporations working at promoting tourism in different countries. We believe that these parties stand to benefit from learning this information as they might be able to translate these actions to their respective countries. For users who are interested in delving deeper and learning the entire story for each of these two counties, we have enabled user-directed interactions with hover and click functionality. This will allow users to explore the embedded information to the extent they want.

We wrapped our project with an open-ended user guided exploration allowing users to learn the tourism pattern of the countries that are of interest to them. As users hover over a country in the world map, we present to them a line graph showing how tourism has progressed in that country. We believe this would keep the user engaged and empower them to explore further to learn about specific trends they notice in any country's data.

4 RESULTS

This visualization delivers a more compelling, interactive way to understand both global and nation-level trends, with clear guidance for the readers, interesting storylines for the layperson (particularly for those with personal interest in tourism), and potentially-actionable anecdotes for governments and key stakeholders in the tourism industry. While it will be insufficient to drive any specific policy action, these narratives can drive both hope and inspire interest in digging into specific policies at a deeper level. Additionally, for both lay people and government stakeholders, the opportunity for user-guided exploration at the end allows for exploration of the trends and nation-level data most relevant for them.

There are several potential use cases for this visualization. The first is for individuals who travel frequently (or aspire to) and thus maintain a strong personal interest in understanding how tourism has changed over time, where other travelers are going, and where there may be some hidden gems for them to explore next. They can also understand some of the normally-invisible factors that may have affected their own travel decisions and experiences due to government investment and support of specific tourism-related policies.

From a macro-level, the global community can understand what nations are likely to be hit the hardest by the travel standstill brought on by the COVID pandemic, and understand the impact MERS had on South Korea as a similar (but much smaller-in-scale example), as well as its recovery. On the scale of local and national governments, those aiming to invest in their tourism industry - to recover and/or to build - can learn about what government policies have worked for Korea & USA, and explore the trends of the countries most similar to them (whether by economics, geography, culture, or other factors) to identify areas for further investigation and/or benchmarking. Finally, private companies in the tourism industry can learn about how Korean entertainment companies latched onto government support and momentum to convert into travel agencies and capitalize on adjacent opportunities, as well as understand where the tourism industry has boomed in recent years and further investigate the policies that supported that growth.

These private industry stakeholders could also target areas for growth in terms of international expansion, and/or use this related research to lobby for specific government policies in relevant areas.

5 DISCUSSION

We have become increasingly globalized and interconnected, as travel has become a bigger part of our lives. This is particularly interesting right now, as COVID reveals not only the downside / risk of this in terms of biosecurity, but also the role that the industry plays in economic growth and sustainability, and how it can have an increasingly large impact on global initiatives and goals like the Sustainable Development Goals.

Specific stories from Korea and the US show us that government policies can and do have an enormous impact on the growth and sustainability of the tourism industry, in both nascent and leading tourist destinations.

Additionally, complete recovery from virus-outbreak-related tourism shock appears to be possible, at least on the ~7-month timescale as shown in Korea from the 2015 MERS outbreak. It remains to be seen how instructive this MERS example can be, as the longer length of time and global scale is expected to provide a much larger shock to the tourism industry, but simultaneously provides a glimmer of hope that while economies may not achieve a "U-shaped" recovery that allows a return to the previous growth trajectory, the tourism industry may be able to do so.

6 FUTURE WORK

There are many ways in which this current interactive visualization work could be expanded. First, there are many more interesting narratives and anecdotes that could be added, such as Iceland, which experienced a relatively sudden but sharp spike in growth over the last 5 years, or countries like Nepal, where an earthquake devastated local economies and depressed tourism significantly.

From an economic perspective, the work could further focus on the tourism industry as a percent of GDP, looking at both macro-level trends and additional standout narratives and anecdotes from specific nations. This could then lead into work focused on COVID impacts, in terms of the most vulnerable nations, updated projections and expectations for those nations, and proposals for specific policy initiatives, public-private partnerships, and/or industry actions to mitigate the impact, protect individuals and industries, and put the right elements in place to prepare for and accelerate recovery and growth.

These events and areas of growth could also be tied to environmental impacts and the effects of sustainability-related policies, actions, and proposals on individuals, rate of growth of the industry, economies, and particular corporations and/or nations.

Finally, it would be interesting to complement the global and national trends with individual stories of those impacted by specific events, policies, and growth or depression of their local tourism industry. These could complement the discussion of potential policy or other proposals for recovery and growth of the global tourism industry in a post-COVID world.

REFERENCES

[1]   D. Glaesser, J. Kester, H. Paulose, A. Alizadeh, and B. Valentin, "Global travel patterns: an overview," *J. Travel Med.*, vol. 24, no. 4, Jul. 2017, doi: 10.1093/jtm/tax007.

[2]   "COVID-19: global revenue of travel and tourism industry 2020," *Statista*. https://www.statista.com/forecasts/1103426/covid-19-revenue-travel-tourism-industry-forecast (accessed May 12, 2020).

[3]   N. McCarthy, "COVID-19's Impact On Tourism: Which Countries Are The Most Vulnerable? [Infographic]," *Forbes*. https://www.forbes.com/sites/niallmccarthy/2020/05/05/covid-19s-impact-on-tourism-which-countries-are-the-most-vulnerable-infographic/ (accessed May 12, 2020).

[4]   "Visualizing the Tourism Economy Around the World," *HowMuch*. https://howmuch.net/articles/visualizing-tourism-economy (accessed May 12, 2020).

[5]   M. Roser, "Tourism," *Our World Data*, Apr. 2017, Accessed: May 12, 2020. [Online]. Available: https://ourworldindata.org/tourism.