

# Corporate Social Responsibility & Big Data:

## The Case of Airbnb

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### Context

The concern for social and environmental health, and the underlying fear that business operations often undermine these concerns is not a new development. Today, however, the Internet provides the public instant and easy access to information on corporate operations and the resulting impacts on social and environmental vitality, and this has led to a more educated and discerning consumer (Lovins, 2006). As a result, the parameters used to gauge a business's success have evolved accordingly, with their relationship to society and the environment in which they operate acting as a critical factor in the measure of their overall performance (ISO, 2010). This has spurred a realization among actors in the corporate world that the real value of a company goes beyond the traditionally accepted share/stock price, to include a number of assets including the quality of products and services, the reputation of the company, and its ability to engage stakeholder interests in a meaningful way (Lovins, 2006). This is manifested in today's corporate milieu through the sheer number of companies engaged in programs deemed as corporate responsibility initiatives. In fact, a vast majority of Fortune 500 companies' websites today publicize their efforts in addressing social and environmental concerns (Bhattacharya & Sen, 2004).

Airbnb is one amongst hundreds of companies that have invested in social responsibility, and while their initiatives have gone beyond the superficial to make real, meaningful impacts on people's lives, their decision to deny the incorporation

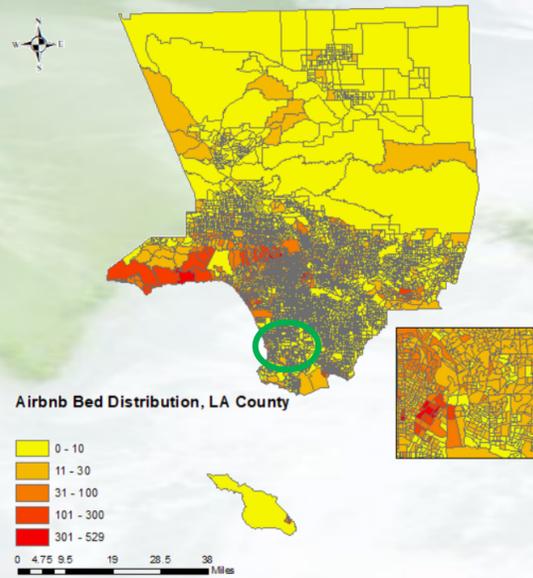
### Airbnb Open Homes

In 2012, Hurricane Sandy left New York and many of its residents in a state of despair as properties were damaged and people left homeless. In response, Airbnb hosts decided to offer their homes for free to neighbors who were forced to evacuate. Inspired by their generosity and initiative, Open Homes became an official part of Airbnb, and the company eventually expanded beyond disaster relief to include temporary free housing for medical stays, refugee support, relief workers, and asylum seekers. The Open Homes program is still very much active, with the latest initiative based in California. As a result of the Kincade Fires in Sonoma County, CA, 206 structures, including 94 homes have been destroyed.

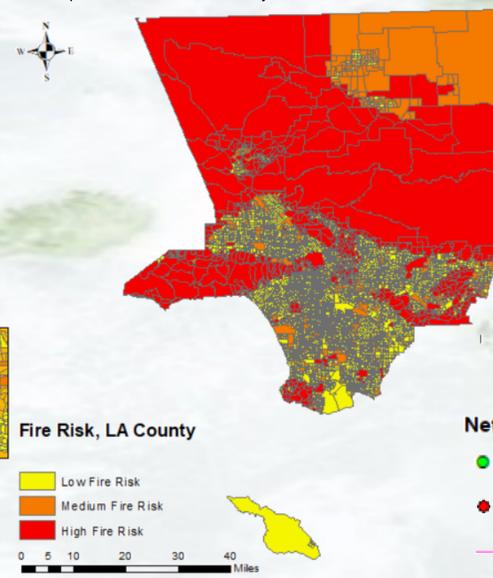
### The Research

The purpose of this study is to illustrate to Airbnb, and other similar companies, that the integration of Big Data can streamline the provision of their CSR services. To that end, I will conduct a Network Analysis to identify the shortest evacuation routes for those populations living in high-risk wildfire areas in the LA County.

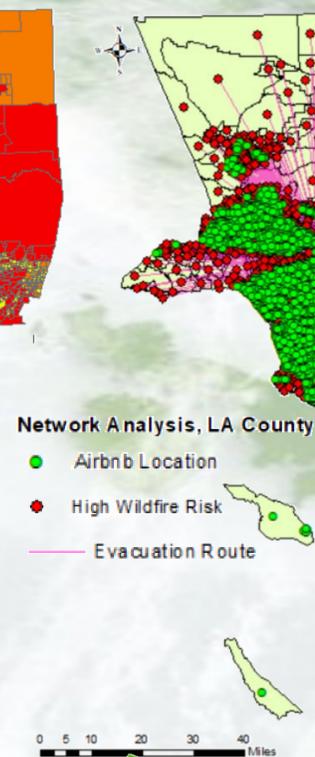
Map 1. Airbnb Beds Distribution, LA



Map 2. Fire Risk in LA County



Map 3. Network Analysis



Map 4. Network Analysis, Granular View

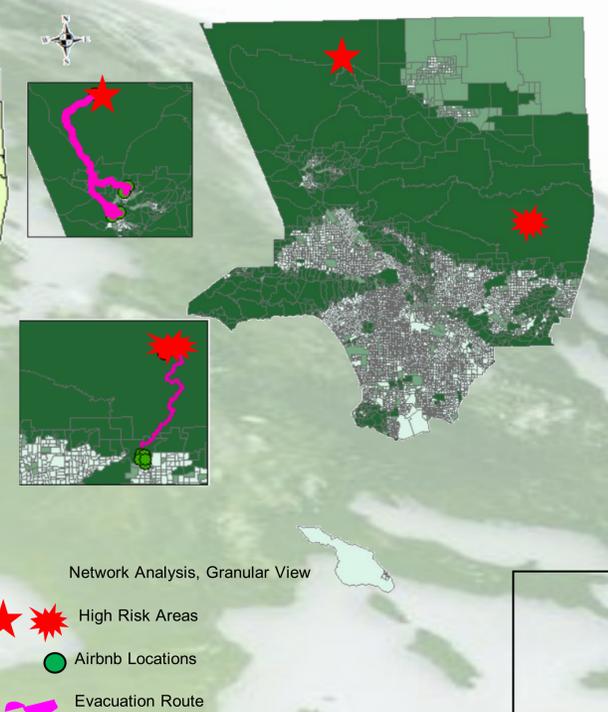


Table 1. Relational Table for Social Vulnerability and Wildfire Risk in LA

	Low Fire Risk	Medium Fire Risk	High Fire Risk
Low Soc. Vulnerability	2,556	303	518
Medium So. Vulnerability	2,410	159	50
High Soc. Vulnerability	364	47	16

### Data & Methodology

1. Airbnb Listings for LA County, 2019: Geocoded points on ArcMap

2. LA County block groups (Polygons) joined to LA County Income, Education Level, and Population at the block group level

3. Fire Threat, California: 30\*30 Meter Raster Data converted to Polygons, and clipped to LA County polygons

All Airbnb listings located in high-risk areas were removed as they will likely be affected by wildfires, thereby making them unsuitable to house displaced populations.

Social Vulnerability Index: Each of the block groups were given a social vulnerability score from 1 to 3, 1 being least vulnerable and 3 being most vulnerable. The score was determined by weighting the proportion of block group residents who had no schooling (.4), only a high school degree (.3), and were under the state poverty line (.3). This resulted in a high score of 45, a low score of 0 and a mean of 18. I gave the block groups with scores between 0 and 10 a vulnerability index of 1, those between 11 and 25 received a 2, and those higher than 25 received a 3. To determine if there was any overlap between socially vulnerable groups and wildfire vulnerable groups, I conducted a Local Moran's I to study the spatial clustering of these variables.

Fire threat: The fire threat file contained threat values between 1 and 5, 1 being low and 5 being extreme. I groups scores 1 and 2 into "Low Threat", 3 into "Medium Threat", and 4 and 5 into "High Threat." Once all the data was prepared and ready for analysis, I conducted a Network Analysis to identify the shortest evacuation routes for each of high-risk block groups.

### Findings

Map 1. illustrates the spatial distribution of Airbnb beds and Map 2. on the right shows fire risk in the LA County. We can see that a majority of the fire risk tends to cluster outside the inner city urban areas. On the other hand, a majority of the Airbnb beds are clustered in the urban city areas. The inset map shows the details of the area encircled in green on the main map, and we can see a cluster of Airbnb beds in these areas. The fact that areas with higher Airbnb beds are located away from the high fire-risk areas uniquely situates Airbnb hosts to provide temporary relief to wildfire displaced populations. It is also important to recognize that certain social groups are more vulnerable to climate disasters than other. As such, please see the table 1. for information on those areas that correspond to high social vulnerability and high fire risk. A vast majority of the socially vulnerable populations are clustered away from the high fire risk areas, although 272 block groups out of the 6,423 are located in areas corresponding to medium-high social vulnerability and medium-high wildfire risk. This could be an interesting area of exploration for future research.

Map 3 shows us all the possible evacuation routes for each of the high wildfire risk block groups. Due to the sheer volume of Airbnb listings and block groups in high wildfire risk areas, the map is very clustered. As such, Map 4. provides a more granular view, using two high-risk block groups as an illustration of the network analysis.

### Limitations

The purpose of this project was to show how the use of Big Data can optimize the provision of CSR services. Airbnb's Open Homes program remains a crucial resource for the people of California, particularly those that reside in high risk areas with a likelihood of being displaced. However, this project is not without its limitations. For instance, the Airbnb listings used were for all Airbnb hosts, not those that are participating in the Open Homes program, because data on Open Homes participants is not publicly available. Furthermore, as mentioned earlier, the fact that Social Vulnerability was not fully integrated into a study of risk is a significant limitation.