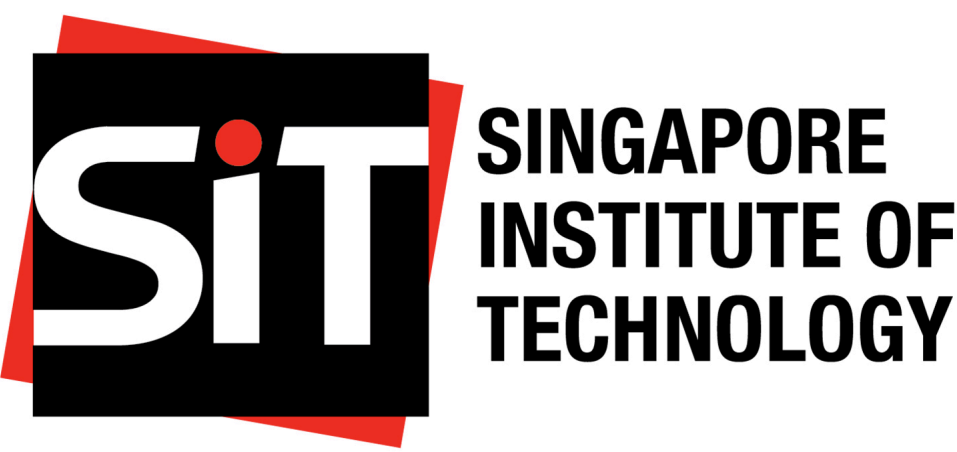


The Rise of Virtual Kitchens (2019–2023)

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INTRODUCTION

The COVID-19 pandemic has transformed numerous industries, and the food and beverage sector is no exception. One of the most notable developments during this period has been the rapid growth of virtual kitchens, also known as ghost kitchens or cloud kitchens. These innovative culinary ventures have gained significant traction, reshaping the landscape of food service. Virtual restaurants in this context means that the restaurant is only available for pickup/delivery and there’s no dine in option. They are “ghost restaurants”, there is no place to walk up to, no signage, no seating. These restaurants operate out of commercial warehouses or trailers. And people usually patronize these virtual restaurants through delivery apps due to the restaurant names, and attractive images.¹ The significance of virtual kitchens extends beyond mere convenience. They represent a fundamental shift in how food is produced and consumed. In this project, we aim to improve the previous visualizations and provide a comprehensive overview on how virtual kitchens have expanded across the various states and transform the food industry, encouraging consumers and restaurateurs to adapt to and embrace this new model.

PREVIOUS VISUALIZATION



Figure 1: Number of virtual restaurants listed on Uber Eats from 2019 to 2023.

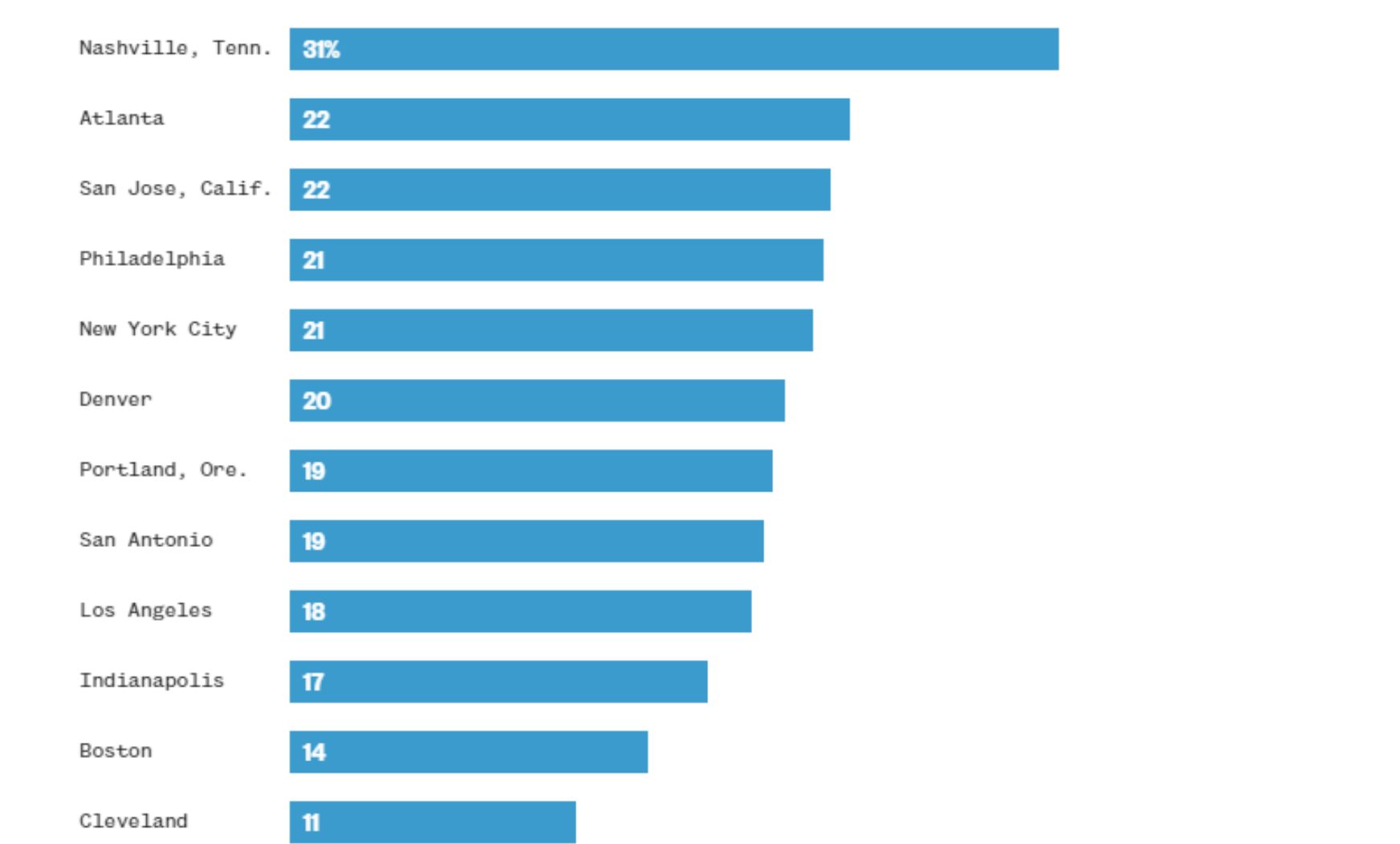


Figure 2: Percentage of restaurant listings in a city.

¹<https://academy.getbackbar.com/understanding-the-concept-of-virtual-restaurants>

STRENGTHS

- The visualisation used in the article emphasises the increase in the number of virtual restaurants listed on Uber Eats from 2019 to 2023.
- The visualisation also highlights the top 12 cities with the highest percentage of virtual restaurants.

SUGGESTED IMPROVEMENTS

1. *Add a plot title and a source note* so that the figure can be understood in isolation (e.g., when shared on social media).
2. *Identify missing data.* Identifying missing data can help readers understand the limitations of the visualization.
3. *Adding a legend.* A legend can help readers understand the visualization more easily.
4. *Include statistics for every state.* Statistics will help readers get an overview of the virtual restaurants in each state.
5. *Using a heatmap.* A heatmap can help readers visualize the distribution of virtual restaurants in different states more effectively.
6. *Having a multiple heatmaps.* Multiple heatmaps can help readers compare the number of virtual restaurant over the years.

IMPLEMENTATION

Data

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Software

We used the Quarto publication framework and the R programming language, along with the following third-party packages:

- *readxl* for data import
- *tidyverse* for data transformation, including *ggplot2* for visualization based on the grammar of graphics
- *knitr* for dynamic document generation

IMPROVED VISUALIZATION

FURTHER SUGGESTIONS FOR INTERACTIVITY

CONCLUSION

We have implemented the suggested improvements to the visualization of