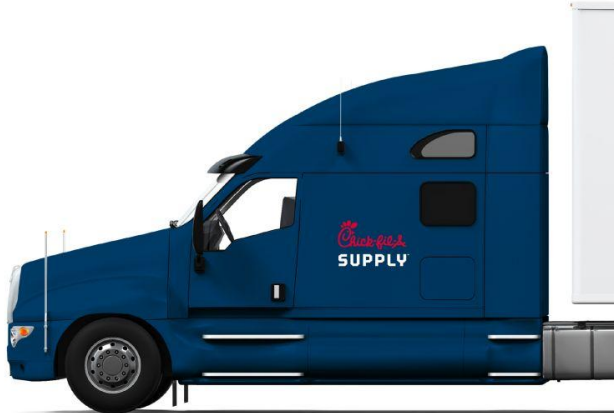


# Chick-Fil-A Supply

*Applying network theory to a growing supply chain business*



**A business built to serve.**



Grace Robinson, Alex Heck, Cooper Foster

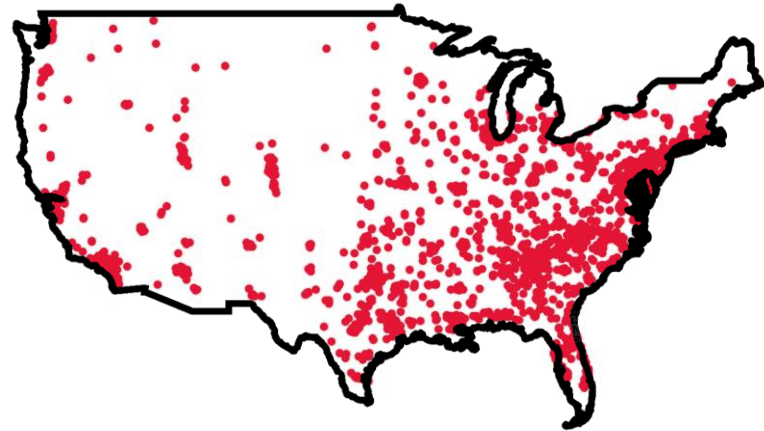
University of Notre Dame

*Network Theory & Analysis*

April 29th, 2025

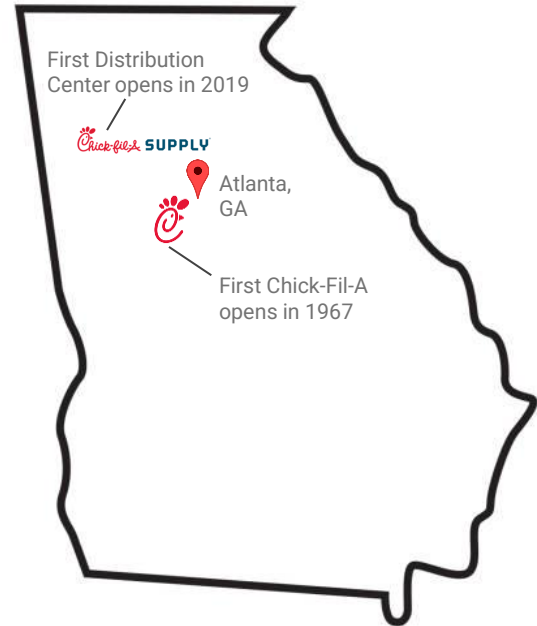
# What is Chick-Fil-A?

- Chain known for their chicken sandwich
- Founded in **1967** in Atlanta, Georgia
- Private-owned, service and value driven
- *Fun fact: 1 in 10 lemons grown in the U.S. ends up at a CFA store to be made in their fresh-squeezed lemonade*



# What is Chick-Fil-A Supply?

- New, wholly-owned subsidiary of Chick-Fil-A
- Launched in 2019
- Vertically integrated supply chain
- Rapidly expanding across country



# What is Chick-Fil-A Supply?

- 13 confirmed distribution centers
- 10 online, 3 to be delivered 2025/2026
- DC location selection is highly complex with many factors



# Network Structure

## NODES

- All Chick-Fil-A locations across the United States
- 3,243 total restaurants
- Obtained through scraping of Chick-Fil-A website

## TIES

- Distance between each Chick-Fil-A location in kilometers
- Calculated using zip codes and 'Geosphere' package in R

# Research Questions

Based on the networks communities:

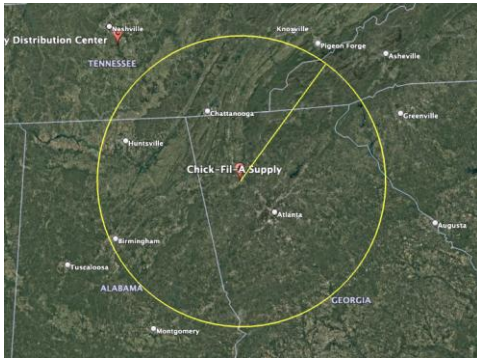
- 1) Does a clustering analysis explain where Chick-Fil-A has placed their existing centers?**
- 2) Where should Chick-Fil-A strategically place new distribution centers?**

# Clustering: Cutoff Selection

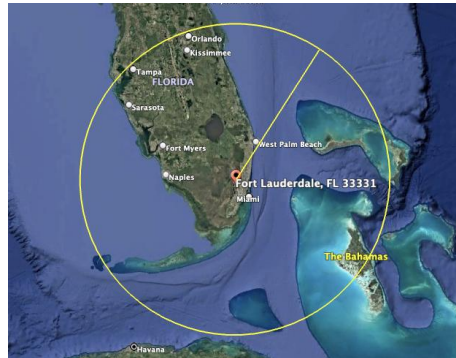
- Not relevant for every single store to be tied to one another
- Distance cutoff must be selected for when not to tie stores (**Network Boundary**)
- Using one number is not appropriate considering different regional store densities, so we used different numbers for different scenarios
- After cutoff selection run **Louvain algorithm**

# Clustering: Cutoff Selection

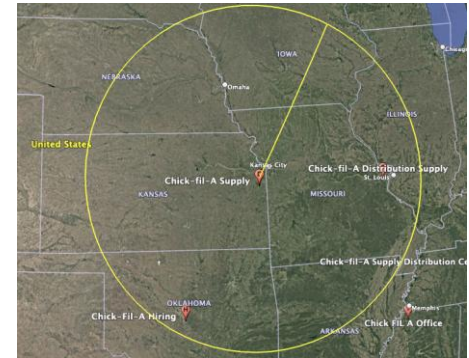
**200 km**  
**30 communities**  
*Cartersville, GA*



**300 km**  
**15 communities**  
*Weston, FL*



**500 km**  
**7 communities**  
*Kansas City, MO*

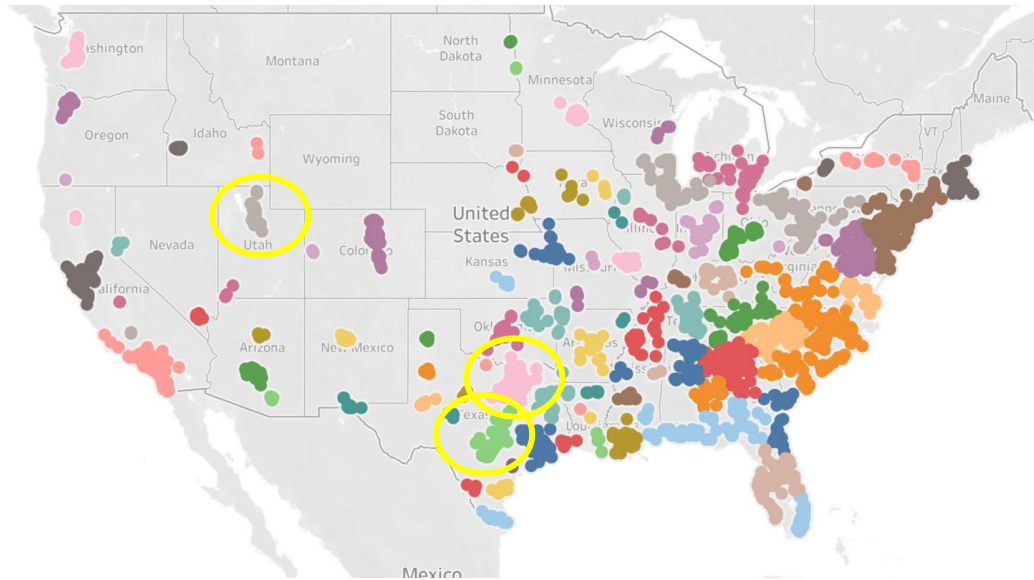




# Clustering: Granular Cutoff Testing

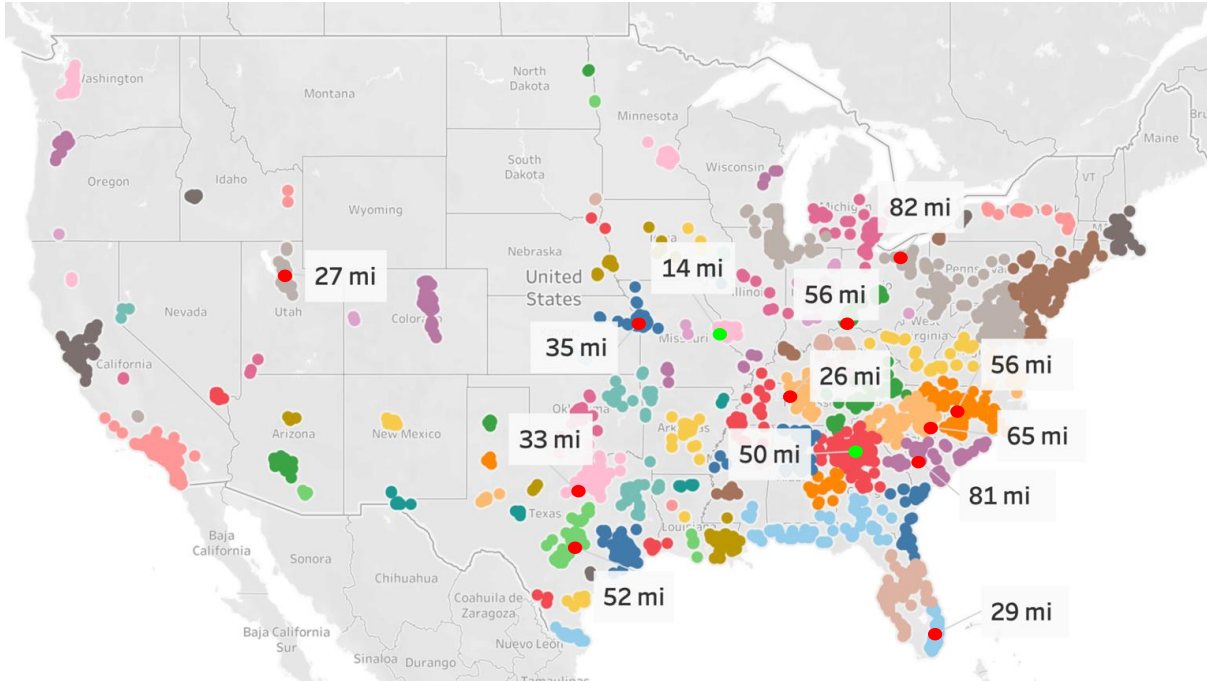
- Clustered network using cutoff values from **50-500** km
- Tested actual number of stores served against number of stores in cluster for each DC
- Selected **75** km due to lowest error, with **145** communities and modularity of **.91**

# 75 Kilometer Radius Communities



- Minimum MAE (# of stores served vs. stores in local cluster)
- 98 communities with isolates removed
- Some DC locations explained well, but not all

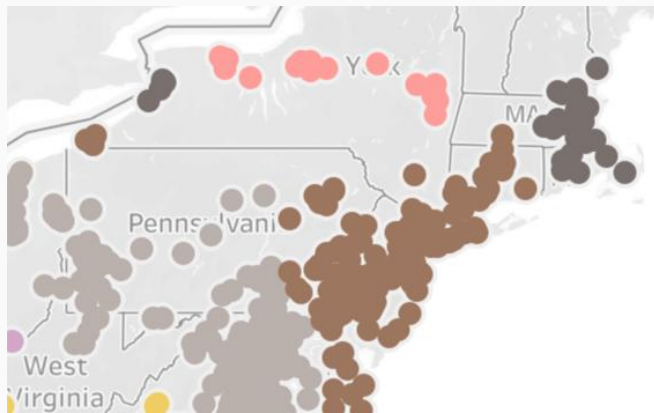
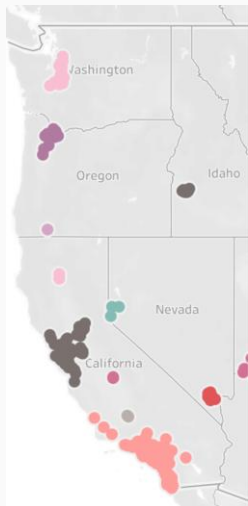
# DC Centrality: Closeness



# Results & Limitations

- Distance calculated “as the crow flies”, but better distance calculations possible
- Despite complexity of DC selection process, simple distance clustering explains selection reasonably well
- Analysis reveals geographic heterogeneity of store location distribution

# Areas for Expansion & Future Analysis



- Explore expansion on west coast and northeast corridor
- Consider rerunning analysis using sophisticated travel distance/time calculation using routing API

# Conclusion

1) Clustering analysis to explain where Chick-Fil-A-Supply locations?

**Yes- optimal distance b/w supply locations and restaurants is consistent with where restaurant density is highest**

2) New distribution centers?

**West Coast (Los Angeles, CA) & (Bay Area)**

**East Coast (New York area)**

**Possibilities for others**



# Implications

- Optimal distance between Chick-Fil-A Supply location and Chick-Fil-A restaurants
- Increased efficiency in stores accessing materials and ingredients
- Additional analysis on potential locations
  - Cost-effective areas for new locations
  - Gauge interest for employees
  - Consider travel times from the supply to restaurant locations
  - Consider weather

# Memes

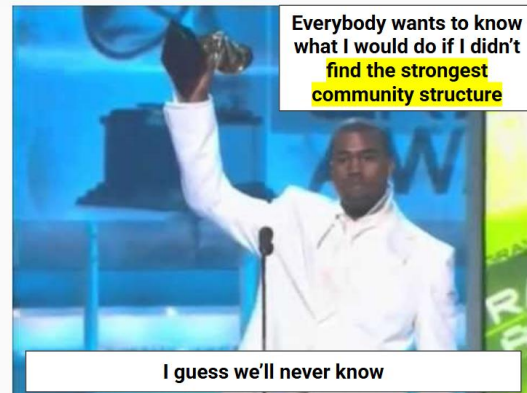
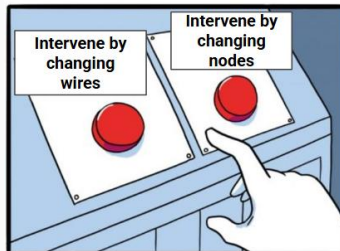


Randomly choosing where to place new Chick-Fil-A Supply locations

Creating a network of Chick-Fil-A locations and clustering it to analyze current and potential Chick-Fil-A Supply locations



When you fit an ERGM with edges, homophily, reciprocity, transitivity AND the model fit is clean!





# Thank You!

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# SOURCES

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<https://www.chick-fil-a.com/careers/culture>

<https://www.chick-fil-a.com/corporate-social-responsibility/community>

<https://www.chick-fil-a.com/customer-support/who-we-are/subsidiaries-and-innovations/what-is-chick-fil-a-supply>

<https://www.forbes.com/sites/pamdanziger/2024/08/22/how-chick-fil-a-will-claw-its-way-back-to-number-one-in-fast-food/>

