Abstract

• Four lessons from the field of forensics will summarize tips to create trade areas for a variety of retail store types.

• The problem: Simple trade area methods don’t work well when you have thousands of convenience stores to study.

• The solution: Using Circle K and other c-stores as an example, this presentation will illustrate a new methodology for creating trade areas using Esri Business Analyst.

• The presentation will discuss
  – the importance of trade area definition and classification,
  – using the right tools,
  – building a methodology and
  – finding the hidden knowledge from analytics.
Beazknees, March 2015. Web. 15 April 2015. All images used with permission.
Lesson #1: Compose the scene

Beazknees, March 2015. Web. 15 April 2015. All images used with permission.
Composing the Convenience Store Scene

- According to NACS, there are about 152,794 c-stores in the US.

- 71% of total sales is from fuel, but that is only 36% of profit dollars.

- 50% of all single serve water bottles and 45% of sports drinks are sold by c-stores.

- C-stores check 4.5 million IDs every day for tobacco and alcohol sales. (TSA only does 1.8 million ID checks per day.)
Composing the Convenience Store Scene

- Gross margins are comparable to grocery stores – around 27%; net profit margin is only about 1%.

- C-stores do about 1,130 transactions per day and average 7,397 transactions per week.

- Heavy shoppers only spend a little over $8 per transactions in the store.

- If an average store does $3 million annually, the net profit would be about $6,000 per week.
Composing the Convenience Store Scene

• Convenience store prices are higher due to:
  – Higher wholesale costs for smaller deliveries
  – Higher utility expenses per square foot
  – Higher real estate costs for corner lots and locations along commuter routes

• Industry faces competitive challenges from
  – QSR, sub shops, coffee shops
  – Drug and grocery stores
  – Warehouse and club stores
  – Mass merchandising stores
Composing the Convenience Store Scene

• **The Challenge:** Understand the current trade areas and identify the best growth strategies for the network.

• NACS has defined 4 Growth Strategies
  – Fresh Value Fast (QSR concept)
  – Family Time (Yogurt concept)
  – My Time (Dollar store concept)
  – Female Friendly (Coffee shop, snack break concept)
Disclaimer

• The data used for this presentation is from Esri Business Analyst software with 2014 data.

• Circle K is not a client of 4CTechnologies or the 4CGeoWorks division and no proprietary or confidential data is being disclosed.

• Store locations were not verified due to time considerations.

• The data presented is for demonstration/instructional purposes only.
Composing the Convenience Store Scene

• Circle K has over 3,300 stores in the US and more than 4,000 locations in other countries.

• March 16, 2015, the Circle K’s parent company, Alimentation Couche-Tarde, purchased about 1,500 c-stores from The Pantry, which is mostly branded as Kangaroo Express.

Composing the Convenience Store Scene

- Which strategy would work best for each trade area?
Lesson #2:
Get the light right

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The Wrong “Light” for C-Store Trade Areas

- Drive time and ring trade areas overlap in some areas.
The Wrong “Light” for C-Store Trade Areas

• Equal competition areas extend the market too far
• Non-overlapping rings are too restrictive; don’t work for rural or highway locations.
The Wrong “Light” for C-Store Trade Areas

• Customer data is not available to create customer derived trade areas.

• Manual trade areas are the most accurate, but not worth the time investment for over 2,700 locations.
The Right “Light” for C-Store Trade Areas

Understand population clusters from census block points

Understand employee clusters from business points
The Right “Light” for C-Store Trade Areas

• I needed a single point layer, but 30 million points?
• Need a way to select points that would make sense.
The Right “Light” for C-Store Trade Areas

- How can the points be used to represent the shape of a reasonable trade area?

- Compare detailed 5-minute drive time to 2-mile ring trade areas.
The Right “Light” for C-Store Trade Areas

- **Solution:** Use the data that I have to create a “pseudo” customer layer.
- Select points within a 5-minute drive time area.
- Assign the points to the closest store to remove any overlap.
- Use the “Customer Derived Trade Area” tool to create areas that are a good representation (abstraction) of a trade area.
Trade Area Creation Process

• Create 5-minute drive time areas using a model to avoid memory issues for over 2,700 locations.
Trade Area Creation Process

• Creating customer derived trade areas for 2,703 locations and 3.8 million customer points only takes about 6 minutes if you have an attribute index on your Store ID field. Without an index, the process takes around 30 hours.

• If you have 10+ million points, it may help to run the processes in ArcCatalog instead of ArcMap.

• If your computer lacks memory or processing power, you can also try using an iterated model approach and then merge the outputs.
Trade Area Creation Process

- Always review the output of the drive time areas before continuing with the process.
Trade Area Creation Process

- Location matters for drive time analysis. Even a small difference in location can have an effect on the resulting drive time.
Trade Area Creation Process

• For very rural areas like Princeton, Maine, the 5-minute drive time area is not appropriate.
Trade Area Creation Process

- For Chatsworth, GA, the combination of the 5-Minute drive time area and the assignment of the demand points to the closest store yielded a strange trade area. In this case, using a selection of points within either the drive time or the ring area would have given better results.
Lesson #3: Build a sequential pattern of search

Searching for Trade Area Patterns

• Which strategy would work best for each trade area?
Searching for Trade Area Patterns

• Use proximity analysis (Summarize) to identify distances to the closest highway exit, major road, number of hotels, schools, large businesses, etc.

• Append data (spatial overlay) to the trade areas.

• Rank the appended data and proximity results

• Create indexes to compare data

• Use grouping analysis to identify different types of trade areas

• Compare index values among different groups
Lesson #4: Show the hidden knowledge

Communicate the relevance

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Resulting Classified Trade Areas

- Each store is classified by the strategy that should be the top priority method for revenue growth
FOR MORE INFORMATION

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14 Technical Tips & Tricks

1. Use ModelBuilder with an iterator to create drive time areas for a large number of stores (and then merge results).

2. Running models in ArcCatalog instead of ArcMap is sometimes much faster.

3. Make sure that there are no duplicate store locations before using this methodology.

4. Create an attribute index for the StoreID in the pseudo customer layer to improve processing time (6 minutes versus 30 hours)
14 Technical Tips & Tricks

5. Send model output to a new file geodatabase when you have thousands of output files.

6. Use “Detailed Drive Time” for a more conservative trade area size. “Standard Drive Time” is faster but creates a larger trade area size.

7. Use the Merge tool in ArcToolbox and not a model or the Geoprocessing menu for faster processing.

8. Review drive time areas before using them to select pseudo customer points.

9. Consider grouping stores into 2 different drive time areas- 5 minutes for most and 10 minutes for rural locations.
10. Hide unnecessary fields when merging business points and block points so that data processes faster.

11. Add a UniqueID field to the pseudo customer layer based on the ObjectID field.

12. Use Spatial Join in ArcToolbox for the fastest assignment of the customers to the closest store.

13. Run the Repair Geometry tool on the trade areas to ensure polygons have the correct geometry.

14. Esri recommends the “Detailed with Smoothing” option for customer derived trade areas, but “Detailed” worked better in this case. Amoeba and Simple also produced less desirable areas.