Enhanced Decision-Making With Mobile Device Tracking Data

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Big data is changing how businesses, property owners, and economic development or business district professionals operate, and in ways we are only beginning to imagine. For many, though, engaging in data collection and analysis can be costly, prohibitively complex, and time consuming. As a result, many small businesses and business districts are not making the attempt, and risk falling further behind chains, private shopping centers, and other competitors. A first step in understanding the potential of these sources may be to examine mobile device tracking, and the insight it can provide.

WHAT IS MOBILE TRACKING DATA?

Rapidly evolving technology is at the core of a revolution in the location, marketing, and management of commercial businesses and properties. Data is being collected in a variety of ways, not all of which will be accessible to small businesses or district organizations. Examples include in-store or online sales, aggregated credit card transaction data, loyalty program data, demographic and market estimates purchased from vendors (with serious reservations about accuracy), social media and web metrics, and competitor research. A different set of techniques focuses on following the movement of potential customers using pressure or optical sensors, RFID devices, and mobile device tracking.

Mobile devices such as smart phones and tablets are constantly sending signals to the nearest tower. Each “ping” records the unique device identifier, its current location, and the time and date. Companies that process the raw data aggregate it to determine each device’s common evening location (interpreted as “home”) and common daytime location (“work”), and link data concerning the device’s presence in an area to these origin locations. Users have two options for accessing data; either through a web portal or as raw data files. Both allow the user to specify a specific geography that they want to examine. This can be as small as an aisle within a store, a particular business, a district, city, or larger region. The size of the region will help to determine the platform that can be used to interpret the data, and a good deal of technical knowledge is required both to process and understand it.

Compared to other sources – or more likely in conjunction with them -- mobile tracking data offers precision in defining the market. This is equally true of a district as it is of an individual location, whether that might be a business, visitor attraction, civic building, park, or any other area. It enhances our ability to define trade areas or track visitor origins and to define competition. The ability it offers to understand patterns of utilization is not something that can be accomplished through other sources.

Cost and technical capabilities may influence how users access the data, or the ability to conduct an analysis. At the lower end of the spectrum, users can purchase access to platforms that offer some visualization of the data, but limited analytical tools. This can cost a few hundred dollars, while access to more comprehensive portals will cost in the tens of thousands. Entry-level portals do not allow data downloads or offer the ability to customize and download visualizations. The more expensive platforms have some tools for manipulating and downloading maps and charts, and also allow data to be downloaded to use in Excel or GIS programs. It is also possible to purchase raw data files for an individual site, enabling exploration of issues (particularly related to tourism) that are not addressed in the online platforms. Use of this data requires an advanced technical knowledge and software capable of dealing with millions of records. The cost to acquire a year of data for a small community may start around $3,000 and increase, depending on the data requested.

The potential and limitations of the data and different approaches can be illustrated through some examples. These range from an introductory use of mobile tracking data to define market areas, to examples of how the data can be used to craft business and marketing strategies, to applications in tourism development.

USING MOBILE TRACKING DATA TO DEFINE TRADE AREAS

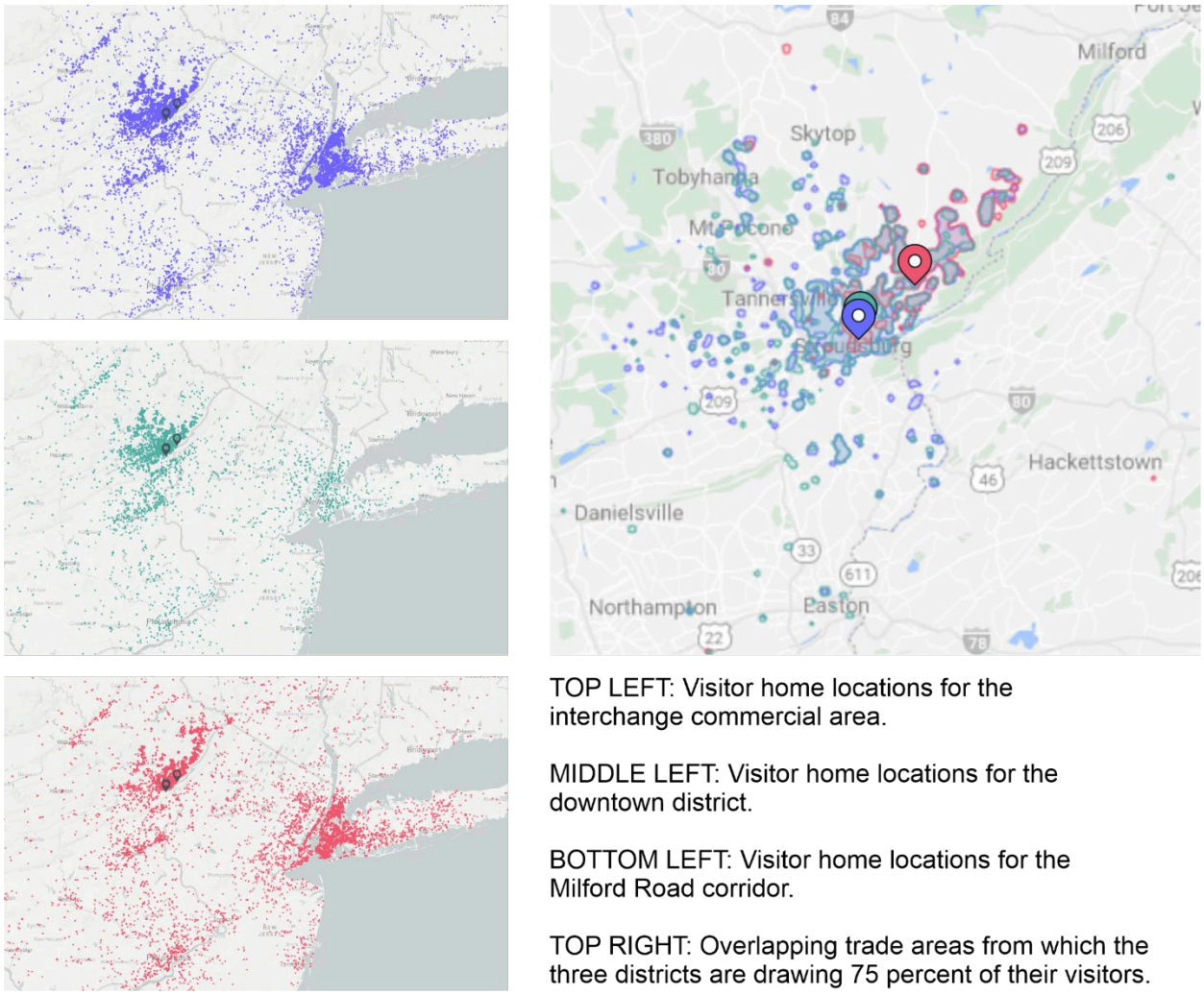
Located in the Poconos region of eastern Pennsylvania, East Stroudsburg is the largest community in the East Stroudsburg Metropolitan Statistical Area. As part of a larger study examining the markets and preparing strategies for industrial, commercial, and residential development, mobile tracking data was used to understand the trade area for three of the Borough's commercial areas. These included the Interstate 80 interchange commercial area anchored by a Walmart Supercenter and Giant grocery store, the traditional downtown with a small number of restaurants, retail shops, and service businesses, and the Milford Road corridor with neighborhood-serving use like a Price Chopper grocery store, CVS, and Rite Aid. The results, based on a full year of data, illustrate the challenges of drawing trade areas using typical approaches such as rings, drive times, or even custom boundaries.

In this case, the trade area was specified as an area from which each district drew 75 percent of its customers. The interchange area had an estimated 3.95 million visitors in 2019 and had an average of 5.78 visits per customer. It draws from the largest region (97.1 square miles), with a population of 77,316. While the downtown's trade area overlaps much of the interchange area's (at 85.82 square miles it is slightly smaller), it has a larger population, with 102,545 residents. Still, the downtown had just 1.52 million visits, with a similar average number of visits per customer (5.25). This indicates a lesser market penetration for the downtown, when compare to the interchange area.

The Milford Road corridor drew 2.78 million visits, with an average of 5.06 visits per customer. Its trade area was the smallest of the three, at 46.55 square miles, and it drew from an area different from the other districts, based on its proximity to rural residential areas north of the borough, while the other districts drew from more central parts of the metropolitan area. For

all three areas, the trade area mapping shows customers from well beyond the immediate region. These indicate visitors traveling to destinations in the area including the Delaware Water Gap, Pocono Mountains, and other tourism destinations.

Figure 1. Visitor locations and trade areas for East Stroudsburg's commercial districts



TOP LEFT: Visitor home locations for the interchange commercial area.

MIDDLE LEFT: Visitor home locations for the downtown district.

BOTTOM LEFT: Visitor home locations for the Milford Road corridor.

TOP RIGHT: Overlapping trade areas from which the three districts are drawing 75 percent of their visitors.

ESTABLISHING A VISITOR PROFILE FOR TOURISM DEVELOPMENT

The case study of East Stroudsburg hinted at tourist traffic to the Borough's commercial areas. Mobile tracking data can be used in conjunction with other sources of information to understand this market, generating the insight needed to create an effective marketing campaign and guide investment in attractions and infrastructure supporting the tourist market.

Okeechobee County is in central Florida, about two hours south of Orlando and an equal distance from either coast. It sits at the north end of Lake Okeechobee. The County's relatively new tourism program sought to better understand its visitors in order to more effectively target its marketing. A full year of data was drawn for all of Okeechobee County, and for Lake

Okeechobee (including portions falling in other counties), the downtown of the City of Okeechobee, and for Kissimmee Prairie Reserve State Park, which lies within the county. A visitor was defined as someone who lived more than 50 miles from the county and whose visit lasted at least two hours. These criteria produced a sample of over 130,000 records.

Figure 2. Home location of all visitors to Okeechobee County

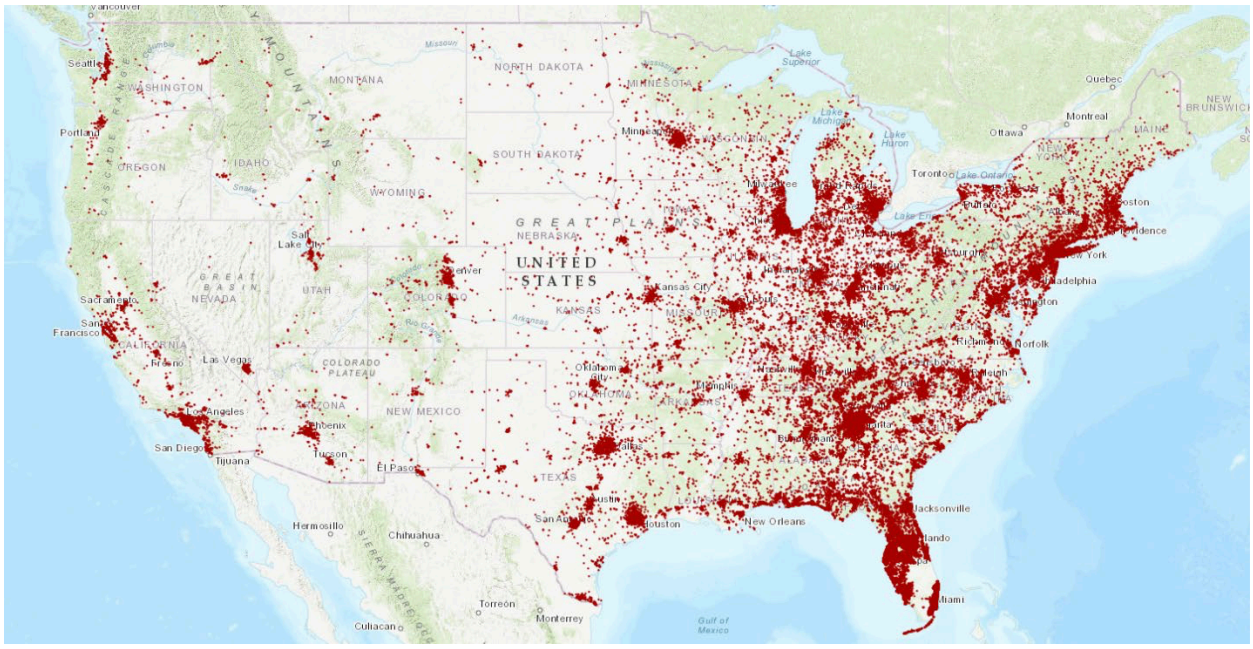
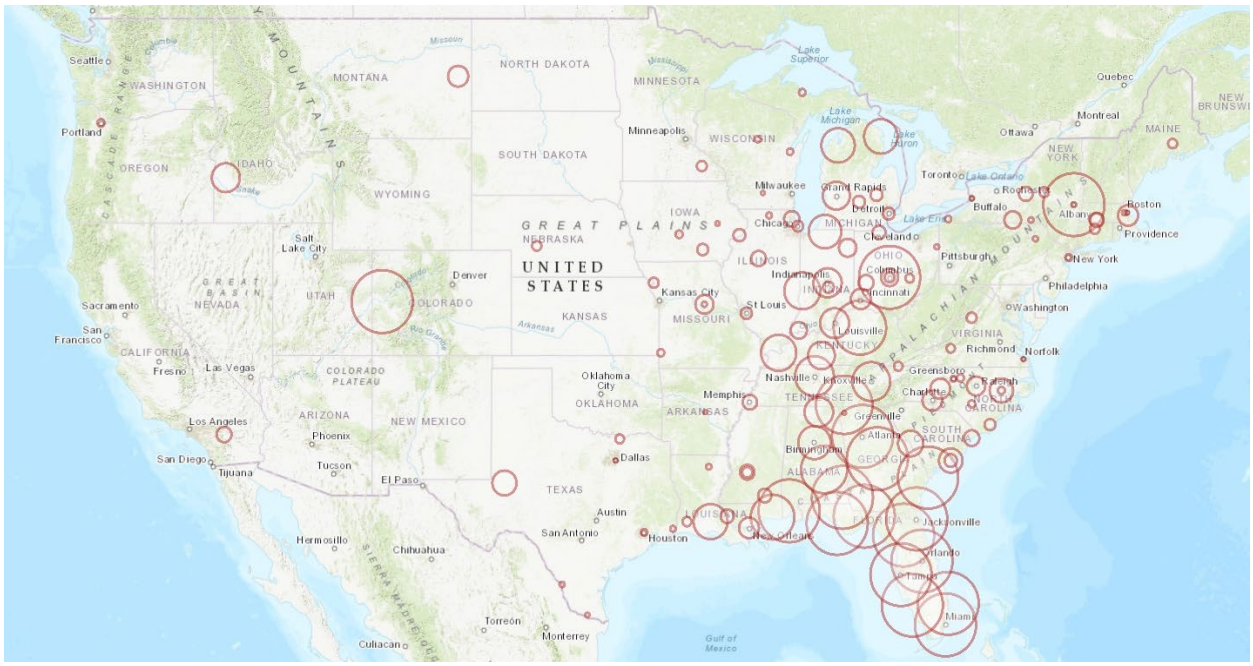


Figure 3. DMAs with a market penetration rate of at least 30 visitors per 100,000 population



Geographically, the county draws visitors from all over the United States and beyond. To better understand any patterns, data was aggregated by both zip code and designated market area (DMA), which are drawn to reflect areas of media influence. Visitation was considered both by the number of visitors drawn from each zip code or DMA, and by market penetration (visitors per 100,000 residents). Using this technique, a pattern emerged of visitors drawn from a corridor extending from Florida through Alabama, Tennessee, Kentucky, Indiana, Ohio, and Michigan. While information about DMAs can be used to determine general media buys and trade show attendance, zip code information allows for more accurate targeting of mail or social media advertising.

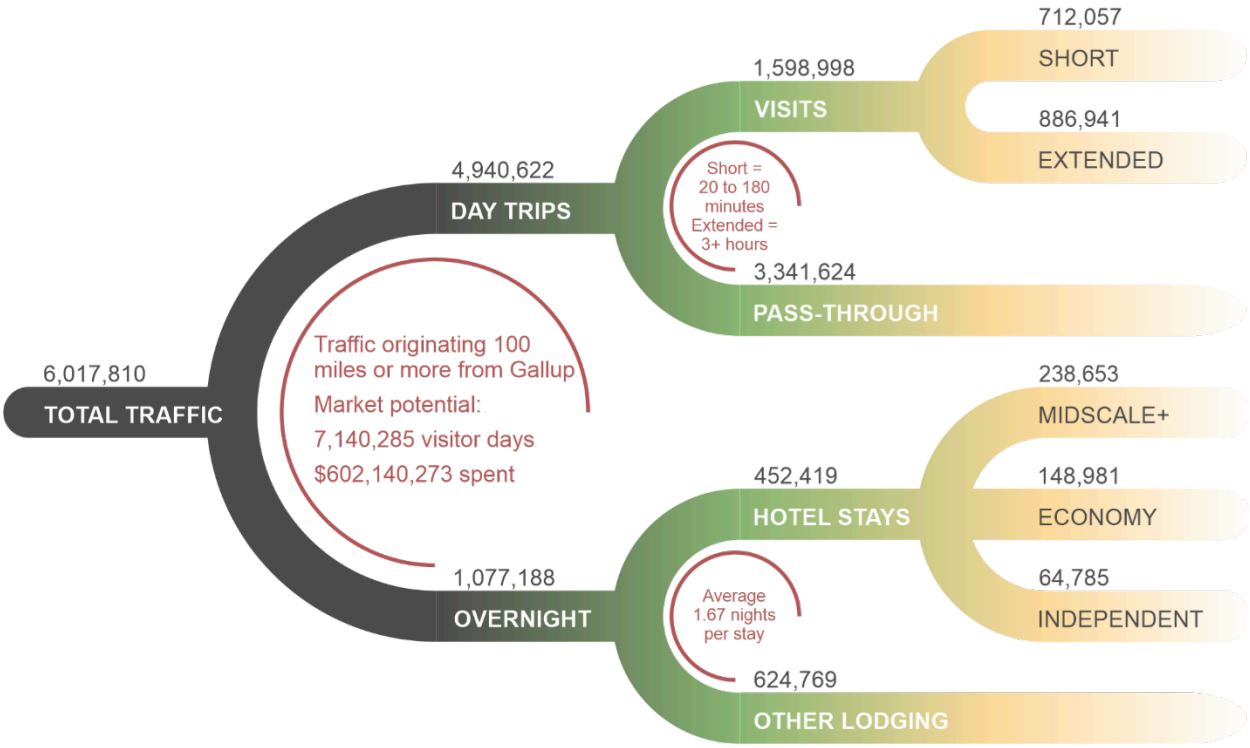
Zip code information is also useful in preparing a demographic analysis of the visitor market. The information used in the analysis was drawn from the American Community Survey. ESRI's Tapestry Segmentation was used to create a profile of the market segments commonly attracted to the county. This offered a more nuanced view of younger visitors coming to participate in outdoor recreational activities, and an older cohort of visitors wintering in the county. Survey research was used to delve further into motivations and perceptions of these visitor groups. Other insight from the mobile tracking data addressed issues such as the day and overnight split, length of stay, variation in visitation by month and by day of the week, and cross-visitation among attractions. It was also used in a model created to estimate the contributions of in-state and out-of-state visitors to retail and dining spending.

ESTIMATING THE SIZE AND IMPACT OF THE VISITOR MARKET

An analysis for the City of Gallup, New Mexico, took the question of visitor spending to a higher level. Tourism is a very important source of income for the city's businesses. The city is an important service center along Interstate 40, has a strong trade in Native American arts (an estimated 85 percent of the trade in authentic Native American arts passes through the city), contains one of the best-known segments of Historic Route 66, and is a jumping-off point for outdoor recreational activities in the region. The challenge was to define the visitor market and its potential spending. Mobile tracking data, combined with independent market research, an expenditure survey, hotel occupancy data, and traffic counts were used to construct a model answering these questions.

Because of the city's very large trade area, a visitor was defined as someone who lived more than 100 miles from the city and who stayed at least 20 minutes. Since it would normally take less than ten minutes to drive through the city, a stop of 20 minutes to three hours was thought to reflect some time spent in the community to get gas, have a meal, or visit shops. A stay longer than three hours might be more likely to include a visit to one or more of the city's tourism attractions. A total market of about 6.02 million people passed through Gallup in 2019, made up of 4.94 million potential day trips and 1.08 million overnight visits. Of those included as potential day trips, 3.34 million pass through without stopping, leaving Gallup with a 47.5 percent share of the total. See Figure 4 below.

Figure 4. Breakdown of visitation to Gallup by type of trip



Visitors have a market potential of $602.1 million in spending, including $198.1 million on lodging, $247.5 million on retail goods, and $156.6 million on eating and drinking. This last sum is greater than the amount spent by trade area residents on eating and drinking.

MAPPING PATTERNS OF USE

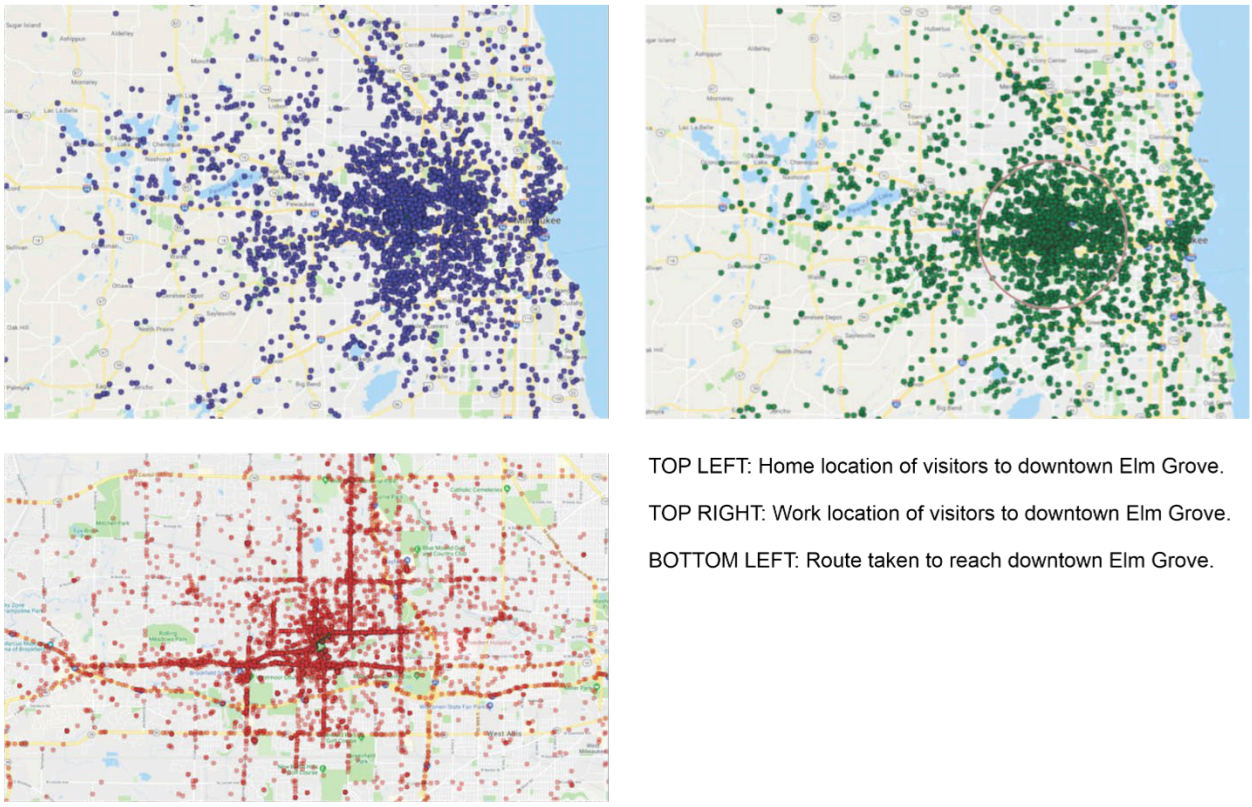
Mobile tracking data can be processed to view patterns of use, linking foot traffic to home or work locations, paths to the target area, and visitation by day and time. It is possible to compare different areas, such as two or more comparable or competing downtowns, and additional features of some platforms provide insight into shopping patterns and activities of visitors.

Elm Grove is a suburb of Milwaukee. Although it only has a population of about 6,200, there are about 172,000 people in the village's trade area, and 187,000 people work within five miles of its downtown. It is a middle- to upper- income community with a white, non-Hispanic demographic. The downtown stretches about four or five blocks, and is anchored by a small upscale grocery store. Bluemound Road, one of the most important commercial corridors in the state, lies a half mile to the south. The corridor includes Brookfield Square, a regional mall with 1.1 million square feet of commercial space. There are significant office parks and a large hospital and associated medical complex in close proximity to the district.

Data was collected for both downtown Elm Grove and for Brookfield Square. Mall customers were thought to present a market opportunity for the downtown, and understanding differences in trade areas and visitation patterns could help to define marketing and other tactics to reach those customers. The analysis revealed a number of patterns that can be used by the district and its individual businesses, to craft effective marketing tactics.

- The average person in the sample visited downtown Elm Grove 2.3 times during the year, staying for a median of 62 minutes. This compared to an average of 1.5 annual visits for Brookfield Mall customers. The mall does pull visitors from a greater distance.
- The downtown sees its traffic peak at mid-day. Friday and Saturday see the greatest volume of visitors, with a significantly lower volume on Sunday. The weekday volume is attributed to the number of nearby employees, and the morning commute is almost as important as the lunch hours.
- While workers are generally an important source of traffic to the district, this is especially true of workers at Froedert Hospital. Targeted marketing to hospital employees, and to workers in nearby office parks, was seen to be an effective way to generate more customer traffic.
- The largest number of downtown visitors come from home (56 percent), and almost two-thirds (64 percent) head home after their visit. About twelve percent come from work to visit the district, while only a little over five percent go to work after their visit. There is some cross-shopping with other shopping centers or businesses along Bluemound Road or near Mayfair Mall.
- Events can have an impact on the number of visitors. On average, there are about 4,000 visitors per day. The 2019 peak came on Memorial Day, when over 12,000 people came downtown for the annual parade. When coordinated with businesses, events such as this one can help to acquaint attendees with the district's businesses, as well as drive some traffic to them during the event.
- Downtown visitors frequent several nearby attractions, including Miller Park (42.3%), Wisconsin State Fair Park (38.1%), Marcus Majestic Cinema (27.8%), Henry Maier Festival Park (27.2%), and the Milwaukee County Zoo (22.6%). Advertising at these venues may be effective in generating more traffic to the district.
- There is a missed opportunity for more restaurants, which will help to increase evening traffic. Downtown patrons are frequenting a handful of restaurants along Brookfield Road, as well as chains at Mayfair Mall, five miles to the east.
- Watertown Plank Road and Elm Grove Road are the primary routes to the district, with several important feeder routes. This insight will help to create an effective wayfinding program. In other communities, this knowledge might be used in ways such as to identify the best locations for advertising signage.

Figure 5. Home, work, and travel path mapping of visitors to downtown Elm Grove



TOP LEFT: Home location of visitors to downtown Elm Grove.

TOP RIGHT: Work location of visitors to downtown Elm Grove.

BOTTOM LEFT: Route taken to reach downtown Elm Grove.

A great number of additional analyses might be conducted with this type of data. An individual restaurant might compare its foot traffic against industry figures to understand how it ranks. A venue such as a theater could analyze its customers to find out how it affects visits to nearby restaurants and bars. A retailer might compare its trade area and demographics to competitors to mine areas from which it can draw new customers. A tourism organization can examine visitation at nearby attractions to suggest ways it can bring those people into its territory. In short, the insight this data offers enables users to create very refined and targeted marketing and business strategies.

The nearby, larger community of Waukesha offers another illustration of how mobile tracking data can increase our understanding of how districts are used. Here, the data was used to produce a heat map indicating where foot traffic is concentrated. See Figure 6 below. Such information could have any number of uses such as in assessing parking needs, prioritizing streetscape improvements, helping to site new businesses, or targeting areas for redevelopment.

Figure 6. Heat map of foot traffic in downtown Waukesha and nearby areas



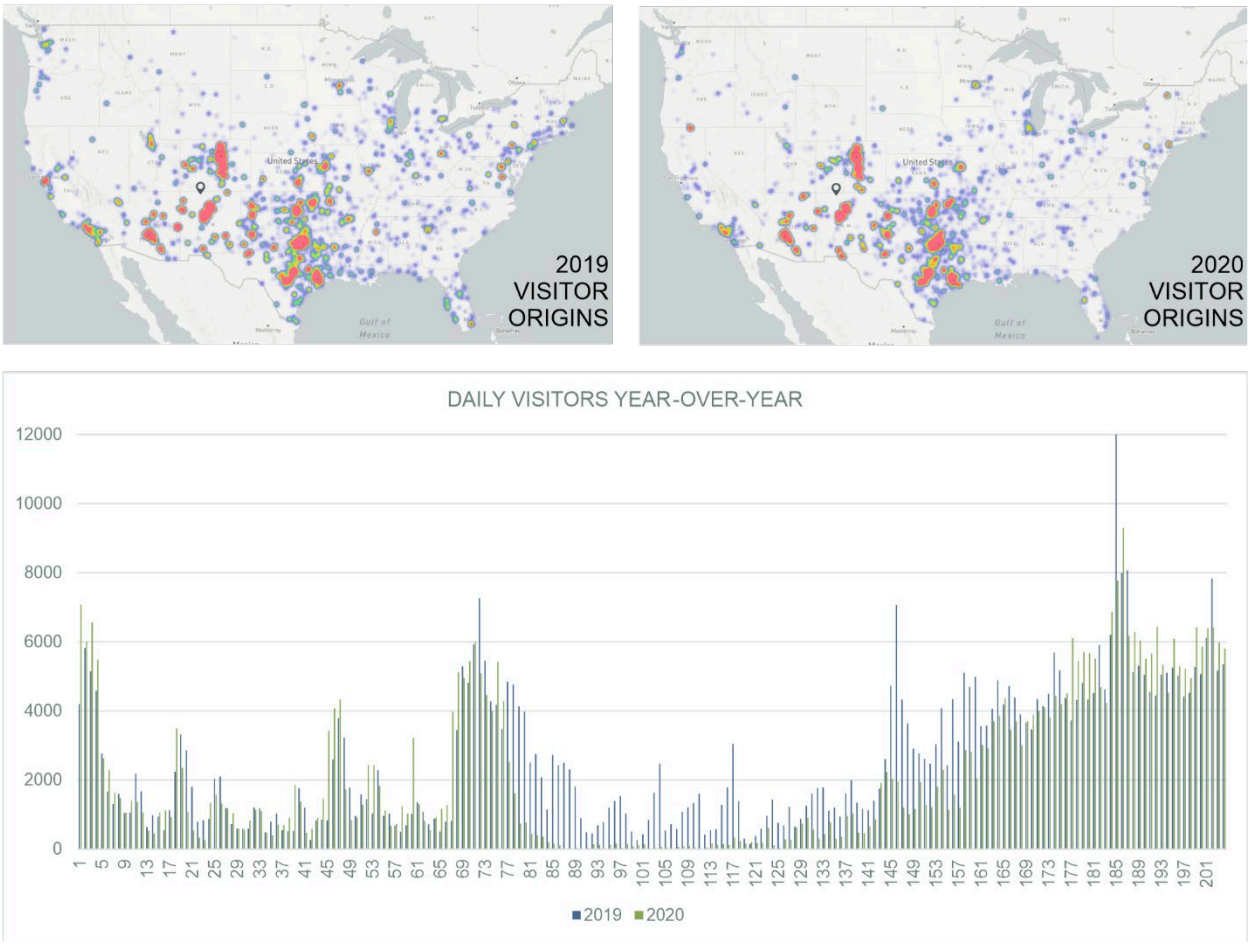
(ALMOST) REAL-TIME TREND ANALYSIS

The sudden and devastating Covid-19 crisis points to another use of mobile tracking data in generating timely analysis of ongoing impacts to commercial and other businesses, or business districts. Even in normal times, simply getting information that economic developers or business district managers can use to understand the businesses in their area may be a challenge. Sales tax data might be one such source, but sales taxes are not collected in many places, while others only tax some items or services, and then the data may be reported as infrequently as annually and aggregated at the city or county level. Many other market research services offer no time series data. With several years of information and frequent updates, mobile tracking data can meet the need.

This is illustrated with a quick look at the downtown area of Pagosa Springs, Colorado. A small mountain community, the town is dependent on a large tourism industry for its mountain recreational opportunities and the hot springs in its downtown. The Covid-19 crisis has impacted travel, which considers visits by people living at least 100 miles from the community. Overall visitation from January 1st, through July 23rd of 2020 (about three days prior to the

analysis) is down 17.6 percent from the similar period in 2019. The years started out with numbers exceeding 2019 visits, but began to decline sharply in March. This lasted through the end of June, and July numbers are mostly better than the prior year.

Figure 7. Visitation Tracking for Pagosa Springs



Differences can also be seen in the regions from which visitors are being drawn. Compared to 2019, more of the 2020 visitors are coming from Colorado and nearby states like Texas, New Mexico, Arizona, and Utah, while visitation from the west coast, east coast, Midwest, and southern states has dropped off.

CONCLUDING THOUGHTS

Information is essential to making smart decisions in business, government, and nonprofit management. The Big Data era promises to bring us a new understanding we never had in the past. Those organizations that are quick to get on board will be able to develop more effective strategies addressing many aspects of their operations. This article offered just a few examples of how one new element – mobile device tracking data – can improve planning and decision-making at the business or commercial district level. When this data can be leveraged with other

existing or emerging sources, it promises to reveal unprecedented insight into our businesses, business districts, competition, and markets.