

# Implementation of Public-Private Partnership Initiatives for Transportation Demand Management: A Study of South Florida Commuter Services

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## Abstract

*Increasingly, in the United States, transportation demand management implementation takes place through public-private partnerships between regional public-sector organizations and private-sector employers. Nevertheless, existing research has almost exclusively focused on employer-sponsored programs. This study focuses on the experience of South Florida Commuter Services, a regional transportation management organization, the primary focus of which is to engage the private sector to promote programs that reduce commuter's reliance on single-occupancy vehicles. Comparing our findings with those of previous research, we conclude that public-private partnerships present certain challenges that are different from those faced by either employers or regional public sector organizations acting independently of each other.*

**Keywords:** We would like to encourage you to list your keywords in this section

## 1. Introduction

The primary objective of transportation (or, alternatively, “travel”) demand management initiatives (TDM) in the U.S. has historically been to reduce single-occupant vehicle (SOV) travel, particularly during peak (rush-hour) traffic [1, 2]. More recently additional objectives, such as enhancing access to jobs and other services of income-disadvantaged people in both urban and rural areas, and forestalling traffic problems caused by road construction projects, have been pursued through TDM initiatives, and TDM is increasingly considered a key component of sustainable transportation systems [1, 3]. This is because transportation is by far the most significant contributor to urban air pollution problems and, at least in the U.S., it accounts for more CO<sub>2</sub> emissions than any other end-use sector [4].

When discussing TDM programs, it is important to note that they can be divided into two major types: area-wide and employer-sponsored [5]. Area-wide programs are typically operated by special public entities and cover relatively large geographic areas, usually metropolitan areas. It is these programs’ activities that, for the most part, focus on activities for the promotion of ridesharing and public transit use, usually along with some information and public education efforts. Employer-sponsored programs, on the other hand, while limited to the employees of a particular company or public agency, have the ability to implement a wider scope of measures to reduce SOV travel during peak traffic: in addition to promoting ridesharing and public transit use, they can also implement telecommuting and alternative work hour programs. Furthermore, when it comes to

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effectiveness, while area-wide programs are only able to effect shifts to alternative means of travel for very small proportions of the area's total population—with the most successful programs achieving 4%-8% reductions in vehicle trips [5]—employer-sponsored programs “can be very effective and reduce vehicle trips by as much as 30%-40% in relation to background conditions” [2].

From a historical perspective, private initiatives, whether individual, such as spontaneous ridesharing and jitneys, or employer-based, such as organized carpools or sponsored van- and bus-pools, precede public TDM efforts. The earliest private initiatives can be traced to World War I and the earliest rise of the automobile [6, 7]. By the time the first public efforts emerged (which were confined to publicity campaigns) at the beginning of World War II, spontaneous and employer-organized ridesharing efforts were well-established and quite effective [8]. The earliest comprehensive public TDM efforts date from the 1970s, when the three primary reasons for shifting the focus of transportation policy from the supply (primarily increasing road capacity) to the demand side became urgent at the same time. These reasons are, essentially, problems that can only be addressed by shifts away from SOV travel:

- ***Resource supply constraints*** such as fuel shortages and significant price increases. Significant reduction in vehicle miles traveled is the only way to reduce demand and address the problem, at least in the short term, before either new supplies can be brought to the market, or technologies that increase fuel efficiency or make fuel shifts possible can be developed.
- ***Transportation infrastructure capacity constraints***, primarily constraints on building new or expanding the capacity of existing roads, bridges, tunnels, etc. Reducing the number of automobiles on the roads, especially during peak demand times, is the only way to address this problem.
- ***Internal combustion engine-generated air pollution***, including atmospheric ozone, nitrogen oxides (NOx), particulate and hydrocarbon concentrations, and carbon dioxide. Again, significant reduction in vehicle miles traveled is the only effective means for ameliorating the situation, at least in the short term (assuming technological fixes can be eventually found).

The combined intensity of each of these three problems seems to be directly proportional to the level of interest in TDM [9, 10]. The two World Wars placed constraints on the supply of fuels to the market, and caused shortages of rubber and of automobile parts for private consumption. By the time of the 1973-74 OPEC oil embargo, however, transportation infrastructure capacity had reached its limits in many U.S. metropolitan regions and the Clean Air Act turned air pollution into a significant constraint on economic activity in many urban areas. Thus, for the first time TDM became a significant long-term public policy effort, and the first area-wide programs were established throughout the U.S.

The experience that has been gained over the intervening 40 years with TDM efforts, indicates that public-private partnerships are a particularly important way for area-wide TDM programs to increase their effectiveness [7, 11, 12]. There are several reasons for this. Often, public, area-wide TDM programs can make available resources (*i.e.*, funding, large potential ridesharer databases, *etc.*) and undertake initiatives (*i.e.*, reduced bulk rates for transit passes, special pricing mechanisms for highway access, *etc.*) that are beyond the means and capabilities of private entities. Furthermore, public TDM efforts involve specialized agencies (transportation management organizations—TMOs) that can develop knowledge and expertise that is difficult for most employers to attain. On the other hand, area-wide public programs need to reach and inform large numbers of commuters but rarely have the funds necessary for mass media campaigns. Approaching commuters through their employers is an effective alternative [7]. Thus, there are important synergies

that are possible between public area-wide programs and employer-based initiatives. It is therefore important to study the ways in which public-private TDM partnerships are formed and the ways in which TDM initiatives are implemented in the context of such partnerships. While a number of studies of employer implementation of TDM measures have been conducted, they have focused on “model” cases and best practices. Many have looked at individual employers without reference to any overarching area-wide programs. Consequently there is a dearth of studies illustrating and relating the experience of regional TMO programs with employers that represent a range of levels of interest in and commitment to TDM [3, 5, 7, 13, 14]. This study begins to address this gap by focusing on the experience of South Florida Commuter Services, a regional transportation management organization, with implementation of TDM initiatives in cooperation with a variety of employers.

## 2. The Study

This study is an in-depth review of the experience of South Florida Commuter Services (SFCS) with eight private-sector employers with whom SFCS worked to establish a range of TDM programs. The data was collected by one of the co-authors who, at the time, was responsible for recruiting companies to partner with SFCS, and for developing and monitoring the implementation of the customized TDM programs that constitute the case studies.

Of the eight companies included in this study, four, Baptist Hospital, American Airlines, Royal Caribbean Cruise Lines, and Tiger Direct are based in Miami-Dade County. Publix Distribution Center and Radisson Bahia Mar Beach Resort are in Broward County, and Office Depot and Mark Group are in Palm Beach County.

What follows in this section, is a description of the structure and operations of SFCS, and discussions of the development and implementation of TDM programs with each of the eight companies.

### 2.1. South Florida Commuter Services

South Florida Commuter Services (SFCS) was founded in 1989. It is a regional transportation management organization operating in Miami-Dade, Broward and Palm Beach counties. The organization’s operations are contracted to a private consulting firm, with the contract being opened to bids every two years. SFCS operates by providing leadership and free support to businesses in the tri-county area to effect change in transportation behavior. The program’s mission is to improve traffic conditions by reducing Southeastern Florida’s dependency on the single occupant vehicle (SOV).

SFCS promotes a wide variety of commute options such as carpooling, vanpooling, transit use, work-hour management, telecommuting, and non-motorized transportation alternatives to both employers and the general public. SFCS maintains a regional rideshare database that matches commuters who are interested in ridesharing, live near one another, work near one another and commute during the same times. Once they sign up to be included in the database, applicants receive a match letter every quarter and a follow-up courtesy phone call to answer any questions they might have about the program. SFCS also works closely with the region’s transit agencies: TriRail, Miami-Dade Transit Agency (MDTA), Broward County Transit, and PalmTran. TriRail and MDTA offer special discounts for pass purchases to employers. These discounts enhance the Federal tax benefits available for employer-sponsored transit pass purchase programs.

SFCS offers an Emergency Ride Home (ERH) program to everyone in the tri-county area using alternative modes of transportation (*i.e.*, modes other than SOV) to commute to work. The program ensures that these commuters using public transit, carpool, vanpool, biking, walking, *etc.* at least 3 days a week (2 days for students) to get to work or school will not be “trapped” without means for getting home in case of an emergency.

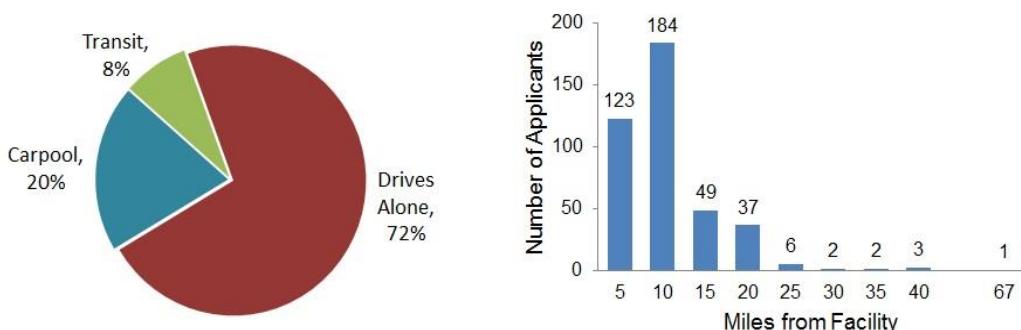
Applicants are able to use up to six vouchers per year to cover the cost of a taxi ride home or wherever the emergency dictates. There are no restrictions placed on the dollar amount to be spent on a single trip. Restrictions are placed on the length of the trip, which is not to exceed 50 miles outside the borders of the tri-county area. In order to be eligible for it, applicants must submit a special ERH program registration to SFCS.

SFCS' budget is about \$2 million, two thirds of which is allocated to staff and overhead, with the remaining one third funding the ERH program and marketing efforts. The program's limited marketing budget is typical of TDM programs in the U.S.A. Nevertheless, marketing is important to the program's success, as it is the primary means for attracting the interest of employers and the general public to TDM. Program staff has to manage marketing funds effectively and be creative in taking advantage of free publicity opportunities. SFCS' marketing efforts to the general public and employers include, but are not limited to, 30-second radio ads, peak hour traffic report sponsorships, billboards, quarterly newsletters, press releases and media interviews. SFCS also contacts employers directly to inform them of the programs available and to elicit an invitation to a meeting.

Employers interested in SFCS programs can request either a staff meeting presentation or a "SFCS Day" at their facility to sign up applicants. At employer staff (generally management staff) meetings, SFCS representatives will explain the programs that are offered and answer any questions that are posed. The objective is to design and schedule a SFCS Day event, during which SFCS staff will have an opportunity to talk to employees, gather information from them, and sign up those interested in the rideshare database and ERH program (all applicants are entered into both the rideshare database and ERH program). Employers that have held an event will receive a follow-up report detailing the commute patterns of their employees and the possible benefits from TDM to the employer and the employees. In addition, SFCS prepares a plan for TDM initiatives tailored to the employer and engages the employer in a discussion of possible next steps, ways to increase employee participation rates, and specific TDM initiatives to be adopted. SFCS staff also follow up with each employee who has filled out an application to determine whether the applicant has shifted to an alternative mode of travel to work.

## 2.2. Case Studies

**2.2.1. Baptist Hospital:** Baptist Hospital is a private hospital with approximately 6,000 employees, located in a moderately densely built suburban area of Miami-Dade County. Several SFCS events that have been held at the site over a period of about five years have resulted in 407 applicants. This represents 7% of the total work force.



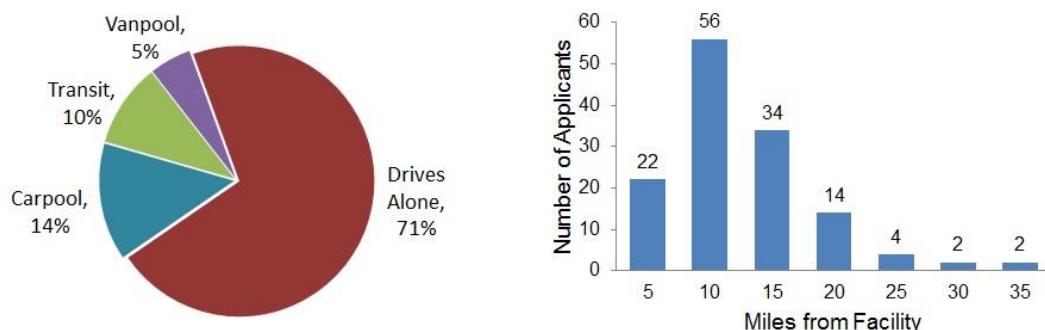
**Figure 1. Baptist Hospital Applicants' Mode Percentages and Commute Miles**

As a result of the rideshare database matching, 190 applicants (47%) matched with others. The average round-trip commute for the 407 applicants is 21.6 miles. As shown in Figure 1, 83 individuals (20% of the applicants) have switched from SOV to carpools and 34 individuals (8%) ride transit because of the ERH program.

Baptist Hospital operates 24-hours per day with staggered work shifts. The variable work hours have led most employees to believe that they would not be able to find any ride-share partners. This has resulted in low interest and, therefore, low turnout for the SFCS events and a low sign-up rate for the rideshare database. This is despite management's high interest in, and level of commitment to TDM: to entice employees to alternative transportation modes, tax benefits are provided for those who ride transit by deducting pre-tax dollars from their salaries for their transit passes. In addition, the hospital subsidizes vanpool riders by paying up to \$60.00 of the total fee. Other incentives for car- and vanpooling include preferential parking in the most convenient spaces on the campus and flextime for participating employees. Finally, information on alternative transportation options is disseminated through the employee newsletter.

An analysis of the spatial distribution of applicants' residences revealed that there is a concentration of employees living directly to the west of the facility, far enough to make feasible several vanpools. Nevertheless, it has been difficult to induce medical personnel to participate in the TDM programs for several reasons in addition to variable schedules. Doctors have been reluctant to participate due to their need to travel from one hospital to another. There has also been difficulty working with the labor unions representing the staff, especially nurses. This is partially because of long-standing distrust between the administration and the unions, and partially because the financial incentives for car- and vanpooling and use of public transit are perceived to benefit only a small percentage of employees.

**2.2.2. Tiger Direct:** Tiger Direct is a computer software and hardware retailer with approximately 450 employees, located at the western edge of Miami's urban core. A single SFCS event brought in 134 applicants. This represents 30% of the total work force. As shown in Figure 2, as a result of the TDM plan put in place after the event, 19 individuals (14%) carpool, 13 individuals (10%) ride transit and 7 individuals (5%) are in a vanpool. The average commute for the 134 applicants is 25.2 miles. Tiger Direct is located at the intersection of major east-west and north-south thoroughfares and, thus, along several bus routes. Two of the east-west routes link with the Metrorail system, making the site readily accessible via public transit.

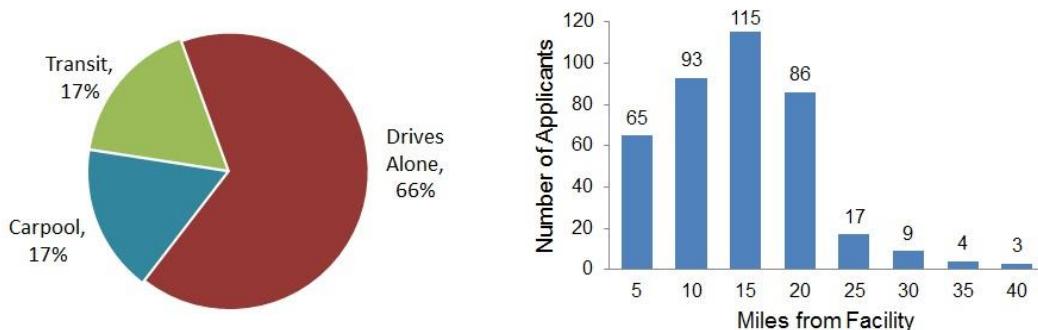


**Figure 2. Tiger Direct Applicants' Mode Percentages and Commute Miles**

As a result of working with SFCS, Tiger Direct has established a successful vanpool program in conjunction with the South Florida Vanpool Program. At first the company only encouraged employees to rideshare. However, serious parking problems, combined with a decision by the Management of the Office Park to tow every car that was not

parked in a designated spot, led the company and its employees to become interested in vanpools as an alternative. The spatial analysis of employees' commuting patterns performed by SFCS indicated that several vanpools would be possible. Thus, in an effort to alleviate the parking problem, Tiger Direct began subsidizing vanpool costs and providing preferential parking to ensure that participants have convenient parking spaces. The company disseminated rideshare information by including the monthly "Commuter News" article, which is offered by SFCS, in their employee newsletter and by including rideshare applications in their employee orientation materials. Since the employees took interest in ridesharing, vanpools have increased dramatically from no vans in the first three months after the SFCS event, to 6 vans in service carrying an average of 42 people.

**2.2.3. Royal Caribbean Cruise Lines:** Royal Caribbean Cruise Lines is a luxury cruise-ship company with approximately 2,200 employees, located within the Port of Miami. A single SFCS event resulted in 328 applicants, about 15% of the total work force. As a result of the rideshare database matching, 201 applicants (61%) matched with others. The average commute for the 328 applicants is 28.4 miles. The spatial analysis of employee commuting patterns indicated that there were many opportunities for utilization of public transit as numerous bus lines and Metrorail have stops in the downtown area that is adjacent to the Port. An inhibiting factor was identified, however, in that none of the bus or rail lines extend into the Port itself. This problem was identified by the employees themselves, as 210 of the 328 applicants expressed on their applications interest in a shuttle service extending from appropriate rail and bus stations.



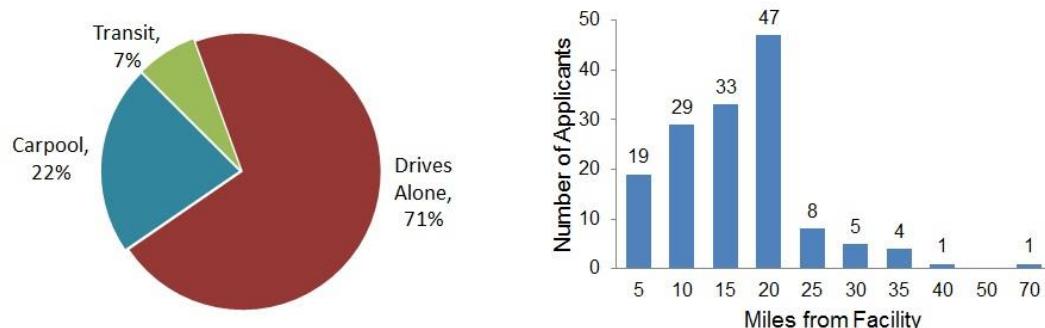
**Figure 3. Royal Caribbean Applicants' Mode Percentages and Commute Miles**

Beginning such a shuttle program, however, proved to be a significant challenge. The most important issue to be resolved was the source of funding. The first sources to be explored were the Port Authority and MDTA. These agencies appeared to be reasonable sources for the necessary funds because of the potential for shuttle benefits to extend beyond the Royal Caribbean employees, to passengers and employees of all cruise lines, as well as to all those working in the Port. However, neither agency was willing to provide the funding. The reasons included political pressure from private transportation interests (taxicab companies, shuttle companies, etc.,) that have historically been successful in blocking major expansions of public transit (particularly direct rail links) to important locations such as the Port of Miami, Miami International Airport and Miami Beach. MDTA in particular did not consider the interest in this service adequate for expanding any bus route. In this assessment, they were driven by past experience, when an attempt to provide a bus route to the Port had failed to attract enough riders to justify its cost. Finally, after three years of failed negotiations in which SFCS had invested considerable time and effort, Royal Caribbean decided to provide funding for two shuttles to run to and from the site to appropriate transit connections, especially the Metrorail.

The company's funding of the shuttle service is its most important contribution to TDM. Ridesharing is encouraged by the provision of preferential parking to ensure participants have access to the most convenient parking spaces. In addition, Royal Caribbean disseminates information on alternative transportation methods by including the "Commuter News" article in their employee newsletter and inserting rideshare applications in their employee orientation materials.

As a result of the company's efforts, a significant number of employees are now able to use public transit (none used it before the shuttle service was put in place). As is shown in Figure 3, of the individuals that have been registered in the ERH Program, 57 (17%) carpool and 55 (17%) ride transit.

**2.2.4. American Airlines:** American Airlines (AA) is a commercial airline company with its main office located in downtown Miami. It employs approximately 5,000 employees. During a single SFCS event, 147 applicants signed up to join the rideshare database representing 3% of the total work force. Of these, 72 (49%) received carpool matches. These applicants' information, displayed in Figure 4, shows that 32 individuals (22%) carpool and 11 individuals (7%) ride transit. The average commute for the 147 applicants is 33 miles.



**Figure 4. American Airlines Applicants' Mode Percentages and Commute Miles**

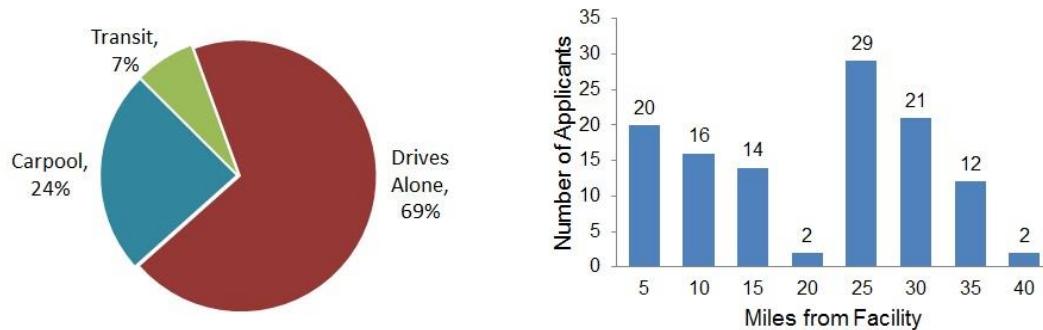
American Airlines present particular challenges to TDM because it is a 24-hour operation with employees working staggered work hours. In addition, many employees work at more than one location, including the three major airports of the region (Miami International, Fort Lauderdale, and Palm Beach) and several offices other than the main office. Although not impossible, this makes it difficult to match people to one another. Among the AA employees who came to the SFCS event, many declined to join the rideshare database because they believed they would not be able to find a match. The most attractive alternative transportation method for AA employees is public transit. However, discussions with them revealed that there are missing links in the transit system that make it very inconvenient for most interested employees. As a result of SFCS' efforts, American Airlines is participating in a shuttle study to increase transit ridership. The focus of this study is to provide shuttle services that serve those who work during peak rush hours since employees traveling at other times have fewer incentives to use public transit. Night shift employees in particular have no opportunities to use transit as most routes do not operate during night hours and those that do, operate at reduced schedules.

AA, while it has supported the program, does not wish to commit monetary resources to support TDM initiatives. This is, in part, due to the difficult financial situation the company is faced with. In addition, they are subject to the Airport Authority which has strict rules limiting possible financial and non-financial incentives that the company could offer its employees. The size of the company is another inhibiting factor. Upper levels of

management located in Miami are difficult to access and their freedom of action is restricted by Corporate Headquarters that are located in Texas. Thus, most of the company support for TDM is in the form if information dissemination through inclusion of the “Commuter News” article in their employee newsletter, holding transportation events and mailing out paycheck stuffers.

**2.2.5. Publix Distribution Center:** The Publix Distribution Center (Publix DC) for south Florida is located in a suburban area adjacent to I 95 in Deerfield Beach (north of Fort Lauderdale). There are approximately 1,300 employees currently working at the facility. A single SFCS event brought in 116 applicants representing 9% of the total work force. As a result of the rideshare database matching, 47 applicants (41%) matched with others.

As shown in Figure 5, 28 individuals (24%) carpool and 8 individuals (7%) ride transit and have been registered in the ERH program. The average commute for the 116 applicants is 40.8 miles (20.4 miles each direction).



**Figure 5. Publix DC Applicants' Mode Percentages and Commute Miles**

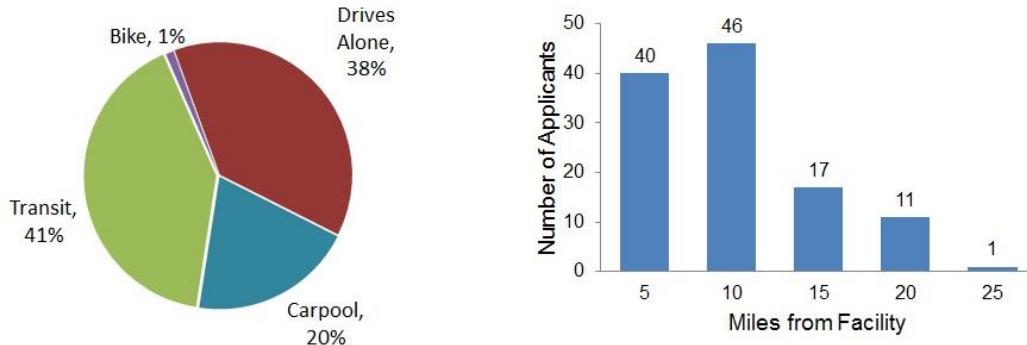
Most of the distribution center employees are seasonal due to the highly variable influx of products, particularly fruits and vegetables, during the year. For this reason it has been difficult to establish a consistent rideshare program. The management encourages ridesharing by providing preferential parking for those employees who carpool and they also include rideshare applications in their employee orientation materials. In all, there is a lack of support and enthusiasm from upper management due to a high percentage of seasonal employment. Because most of the employees are not permanent there is a lack of loyalty and motivation to participate in extra activities. However, it may still be important to educate and inform them of the various commuting options available to them. They may begin to take advantage of them as they move on to other, often permanent jobs.

**2.2.6. Radisson Bahia Mar Beach Resort:** Radisson Bahia Mar Beach Resort is a large hotel located at the Fort Lauderdale oceanfront, along a bus route. It has approximately 300 employees. Two SFCS events brought in 115 applicants representing 38% of the total work force. As a result of the rideshare database matching, 35 applicants (30%) matched with others.

As shown Figure 6, 23 individuals (20%) carpool, 47 individuals (41%) ride transit and one person (1%) rides a bicycle. The average commute for the 115 applicants is 20.2 miles.

The Hotel's management has been very supportive of TDM initiatives. Many of their employees are recent immigrants, primarily women, and do not drive. The Hotel perceives their support for TDM as a benefit they can provide their employees that is inexpensive for the Hotel but very important for the employees. After exploring with SFCS the various possible TDM strategies that would make sense for their employee pool, Radisson Bahia Mar began to offer employees the option of having pre-tax dollars deducted from their salaries for the purchase of transit passes. Because they do not have

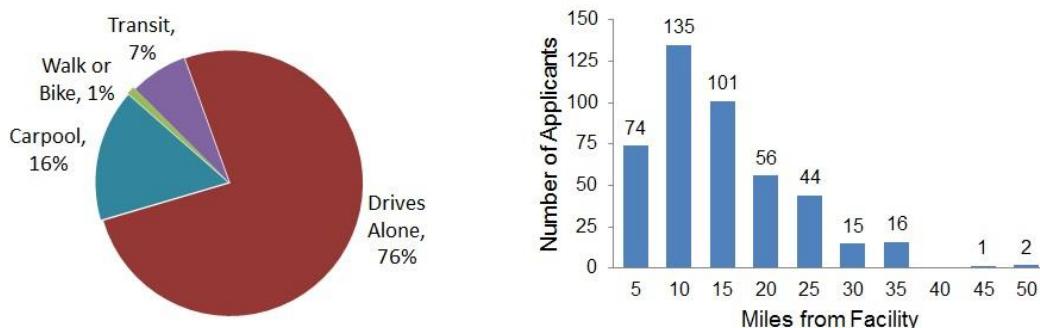
an employee newsletter, quarterly paycheck stuffers are utilized to inform staff about transportation issues and programs. The stuffers are printed in both English and Creole. They also include rideshare applications in their employee orientation materials to help them, as soon as they are hired, find a carpool partner or to register them in the ERH program if they are using an alternative mode of transportation.



**Figure 6. Radisson Bahia Mar Applicants' Mode Percentages and Commute Miles**

Working with Radisson Bahia Mar led to an important improvement in SFCS' practice. Prior to that time, SFCS made all its materials (including its web page) available in English and Spanish. After its experience with the hotel, it has also made all materials available in Creole. At the first SFCS event at the hotel there was very low employee turnout. It was then that SFCS was made aware that a large number of the hotel's employees were recent Haitian immigrants. A second event was scheduled, for which a Creole translator was temporarily hired and information was printed in Creole. Attendance at that event was much higher. There was appreciation amongst the employees at Radisson Bahia Mar for the extra effort put forth by SFCS and this led to positive perceptions towards both the agency and TDM initiatives.

**2.2.7. Office Depot:** Office Depot is a chain store specializing in the sales of office supplies. The corporate headquarters is located in suburban Delray Beach, in Palm Beach County, south of West Palm Beach, close to the I-95 corridor and TriRail. There are about 2,100 employees currently working at the facility. A single SFCS event brought in 444 applicants representing 21% of the total work force. As a result of the rideshare database matching, 269 applicants (61%) matched with others.



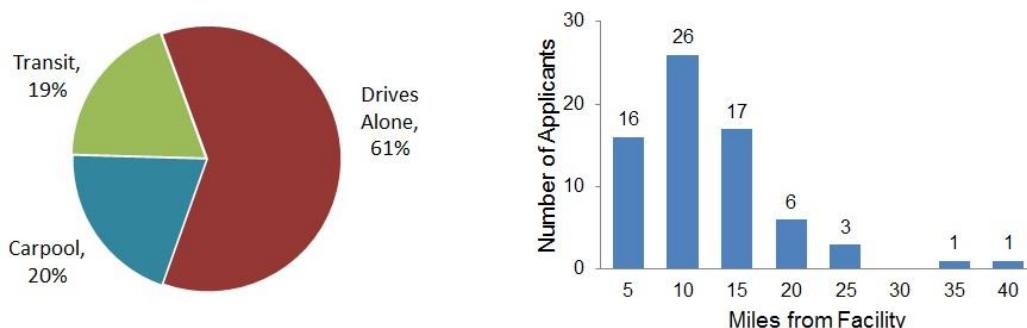
**Figure 7. Office Depot Applicants' Mode Percentages and Commute Miles**

As shown in Figure 7, 69 individuals (16%) carpool, 32 individuals (4%) ride transit, and 2 individuals (1%) walk or bike and have been registered in the ERH program. The average commute for the 444 applicants is 29.8 miles.

The Office Depot headquarters is the first site to try out new programs before they can be implemented at other locations. The corporate leadership has embraced the SFCS program as they see the benefits of ridesharing for their Associates nation-wide. They are currently researching ways for developing a shuttle service from appropriate TriRail transit stations. To promote transit use, they have signed up into TriRail's EDP Program and to promote carpools and vanpools, they are providing preferential parking in the most convenient spots. They also find information a valuable tool, therefore, they include "Commuter News" in their employee newsletter and display a transportation board in the common area. They also promote flextime and compressed workweeks as well as telecommuting to applicable employees. Finally, they deduct pre-tax dollars for those employees who purchase transit passes. SFCS staff have found the experience of working with a national corporate office very useful because of the consideration of ways in which TDM programs can be implemented nationally.

**2.2.8. Mark Group:** Mark Group is a catalogue retailer located in suburban Boca Raton, in southeastern Palm Beach County, adjacent to I-95 and close to TriRail. The company has approximately 250 employees. A single SFCS event brought in 70 applicants representing 28% of the total work force. As a result of the rideshare database matching, 20 applicants (29%) matched with others.

As shown in Figure 8, 14 individuals (20%) carpool and 13 individuals (19%) ride transit and have been registered into the ERH program. The average commute for the 70 applicants is 24.8 miles.



**Figure 8. Mark Group Applicants' Mode Percentages and Commute Miles**

Currently, the Mark Group is trying to find a way to develop a shuttle service from the nearest TriRail station. To promote transit use, the company has signed up with TriRail's EDP Program which enables it to buy passes at reduced prices. Furthermore, in order to promote ridesharing the company has began providing preferential parking for carpools in the most convenient spots. To disseminate information to employees, a "transportation board" has been installed in the cafeteria showcasing various transportation options and programs that are currently available and the "Commuter News" article is included in the employee newsletter. Finally, the company deducts pre-tax dollars for those employees who purchase (the discounted) transit passes.

The Mark Group has been an active in working with SFCS in part due to the right person in HR being appointed the ETC. At first there was little response from the company, because the HR Director was very busy with other tasks. After a few months, it was suggested by SFCS that one of her staff be appointed to work on TDM program development and implementation. Since that time, there has been a tremendous response

from both the employees and the employer. It is important to designate as a liaison with SFCS a person who can devote significant time to the program and who ultimately believes in it, too.

### 3. Analysis and Discussion

The group of employers included in this study is quite diverse in terms of a number of different characteristics. They vary in size from 250 to 6,000 employees, in location from close to the central business district to suburban locations, and in proximity to public transit from very close to several bus lines to within reasonable distance of a single rail or bus stop. Their institutional characteristics are also quite diverse with significant differences in corporate culture, employer-employee relationships, *etc.* The outcomes obtained by each employer, in terms of number of employees signing up for the rideshare and ERH databases and, ultimately, utilizing alternative modes of travel to work, as well as in terms of TDM initiatives that the employer undertook, also vary considerably (see Table 1 and Table 2). And while the number of employers included in this study was relatively small because of the desire to describe and analyze each case in some detail, there nevertheless appears to be at least one obvious trend: program effectiveness seems to be greater for smaller employers.

**Table 1. Summary of Indicators for each Employer**

Employer Indicator	Baptist Hospital	American Airlines	Royal Caribbean	Office Depot	Publix Dist. Cent.	Tiger Direct	Radisson Bahia Mar	Mark Group
No. of employees	6,000	5,000	2,200	2,100	1,300	450	300	250
No. of applicants	407	147	328	444	116	134	115	70
Applicants as a %	7%	3%	15%	21%	9%	30%	38%	28%
Average distance traveled	21.6	33.0	28.4	29.8	40.8	25.2	20.2	24.8
No. using alternative modes	117	43	112	103	36	74	71	27
% of applicants using alt. modes	29%	29%	34%	23%	31%	55%	62%	39%
% of employees using alt. modes	2%	1%	5%	5%	3%	16%	24%	11%

**Table 2. Summary of TDM Measures Adopted by each Employer**

Employer Measure	Baptist Hospital	American Airlines	Royal Caribbean	Office Depot	Publix Dist. Cent.	Tiger Direct	Radisson Bahia Mar	Mark Group
Info./newsletter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Preferential parking	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Pre-tax dollars	Yes	No	No	Yes	No	No	Yes	Yes
Flex-time/telecommuting	Yes	No	No	Yes	No	No	Yes	Yes
Transit pass program	No	No	No	Yes	No	Yes	Yes	Yes
Subsidize van/buspooling	Yes	No	Yes	No	No	Yes	No	No

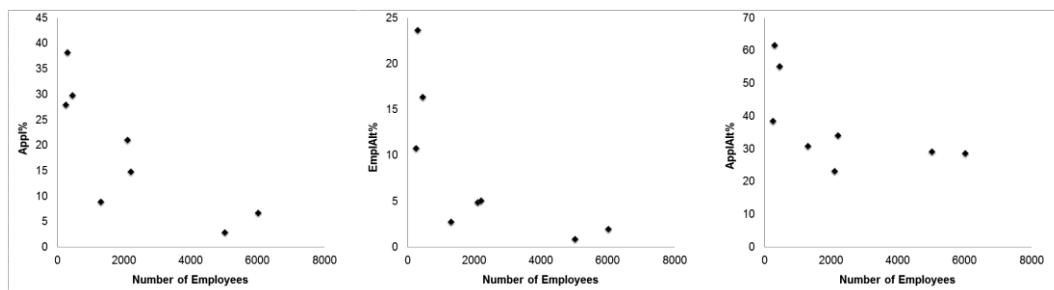
The small sample size places a rather strict limit on the statistical analyses that can be performed. For this reason we decided to focus our quantitative analysis on the

relationship between program success and two factors: employer size and the average distance employees need to travel to get to work. The reason for focusing on employer size as a factor of program success is that, as mentioned above, there is an obvious negative relationship between the number of employees of the employers included in this study and all indicators of program success (applicants for inclusion in the rideshare database as a percent of employees—"Appl%", percent of employees switching to alternative modes of transport—"EmplAlt%", and percent of applicants switching to alternative modes of transport—"ApplAlt%"). If such a relationship is true, it is inconsistent with previous research that has found that employer size is not a significant factor in determining TDM program effectiveness [5].

In addition, we decided to explore the statistical relationship between commuting distance (*i.e.*, the average distance employees need to travel to get to work for each employer) and program effectiveness because previous research [5, 7] shows this to be one of the factors that significantly impact effectiveness in a positive way (the further employees need to travel to work, the more likely they are to participate in TDM initiatives). Furthermore, SFCS uses this factor as an important measure of the benefit employees will derive from their company's undertaking a TDM initiative when it is recruiting employers.

### 3.1. Statistical Analysis of Employer Size as a Factor in Program Effectiveness

Visual inspection of the data indicated that the relationships between the scalar variable representing the size of the employer ("Employees") and the scalar variables representing program effectiveness ("Appl%", "EmplAlt%", and "ApplAlt%") are not linear (see Figure 9). This makes intuitive sense, as a linear relationship would imply that TDM program outcomes could be negative (*i.e.*, inducing more people to use SOVs to commute to work) for very large employers.



**Figure 9. Scatterplots of Number of Employees with each of the Three Measures of TDM Program Success**

The shape of the data plots indicates that either a logarithmic, power, or exponential model would best represent the data. Curve estimation analysis indicates that the logarithmic and power models provide a better fit than the exponential model. Of the former two, the power model is preferable because the logarithmic model produces negative results for large values of the independent variable. Use of such models results in statistically significant relationships between "Employees" and each of the three quantitative program effectiveness variables (Table 3). In practical terms this means that the data indeed reveal a consistently negative relationship between employer size and program effectiveness: the larger the size of the employer, the lower the expected effectiveness of TDM programs.

**Table 3. Regression and Curve Estimation Analysis Relating Employer Size (“Employees”) with Program Effectiveness Measures**

Measure	Appl%			EmplAlt%			ApplAlt%		
Model	Log.	Power	Exp.	Log.	Power	Exp.	Log.	Power	Exp.
R	-.888	-.843	-.843	-.837	-.892	-.846	-.757	-.766	-.615
R <sup>2</sup>	.788	.711	.710	.700	.796	.716	.573	.587	.378
Sig. (2-tailed)	.003	.008	.009	.010	.003	.008	.030	.027	.105

### 3.2. Statistical Analysis of Commuting Distance as a Factor in Program Effectiveness

The findings of previous research would induce us to formulate the hypothesis that the average distance over which employees commute to work would be positively related with TDM program effectiveness. This formulation allows us to test the hypothesis using a one-tailed test for significance.

**Table 4. Correlations between Commuting Distance (Avg. Dist) and Measures of Program Effectiveness**

		Appl%	EmplAlt%	ApplAlt%
Avg. Dist	Pearson Correlation	-.578	-.597	-.528
	Sig. (2-tailed)	.134	.118	.178
	Sig. (1-tailed)	.067	.059	.089

As can be seen in Table 4, the correlation analysis shows, that for our sample, none of the three variables indicating program effectiveness is affected by commuting distance at the .05 confidence level. Though the one-tailed significance tests range between .059 and .089, it would be a mistake to claim that there are significant correlations at the .10 level because the Pearson R values are negative, not positive as hypothesized. Two-tailed significance levels fail to reject the null hypothesis (that there is no relationship between commuting distance and program effectiveness) at the .10 level as well.

The most likely explanation for the rather counter-intuitive negative sign of the correlation coefficients is a positive association (which, however, cannot be analyzed quantitatively due to the small sample size) between average commuting distance of applicants and employer size. Inspection of the descriptive statistics revealed that the average commuting distance for only one of the larger employers was below 25 miles, while for all of the small employers it is 25 miles or less.

It is important to note that the correlation analysis indicates very strong positive relationships between the three measures of program success. This indicates that there is good internal cohesion of this set of measures. It is especially notable that there is a strong positive correlation between the proportion of employees who apply for inclusion in the rideshare database (Appl%) and the proportion of applicants who then utilize alternative modes of transport (ApplAlt%) ( $R=.799$ ,  $p=.017$ ). This means that the greater the proportion of employees who become applicants, the greater the proportion of applicants who switch away from single-occupant vehicle transportation.

## 4. Conclusions

This study of TDM programs developed by employers in partnership with a regional TMO has produced some results that appear to diverge from the findings of previous studies. The most important of these differences is the strong negative relationship between employer size and TDM program success. The lack of any positive effect of

employee commuting distance on program success could also be explained by the overwhelming effect of employer size. What is particularly important about these findings is that they can be attributed to the character of public-private partnerships. As has been mentioned above, previous studies have focused on employers that were generally self-motivated to undertake TDM initiatives—*i.e.*, the management of which was interested in TDM. In this study, the primary motivation came from SFCS, which had to engage with the management of employers in order to promote TDM. As the case study discussions indicate, there were numerous problems that made it difficult to design and implement effective TDM programs for the larger employers—difficulties in approaching and engaging upper management, problems in labor-management relations, organizational culture problems, *etc.* In a self-selecting environment these types of problems are likely to exclude those employers that suffer from them from developing any significant TDM programs. Thus, these employers are more likely to not be studied.

If employer size truly has a negative impact on TDM program effectiveness, there are significant consequences for the way in which TMOs pursue their objectives. At this time, SFCS and, likely, other TMOs working with employers in similar ways) prioritizes large employers for marketing efforts such as direct mailings because they believe that, in this way, they can maximize the number of commuters that can be reached. This study, however, indicates that working with large employers can be more resource intensive for a TMO than working with small ones, and the number of commuters reached and persuaded to change commuting behavior may not be all that different. Focusing on large employers may be a less effective use of TMO resources.

In addition to the results of quantitative analysis, the case study discussions also reveal some important lessons. The cases of Baptist Hospital and American Airlines indicate that variable work hours are an inhibiting factor in recruiting employees to carpool. Variable work hours pose a problem because they tend to decrease the number of applicants who find carpool matches through the rideshare database but, even more importantly, it causes the perception that a match will be impossible to find. Employees then tend not to even sign up with the database. For example, 190 of the 407 applicants at Baptist Hospital received at least one match. This represents a matching rate of 47%, which, while at the lower end of the scale, is still within the typical matching rate that ranges between 45% and 60% for all employers. For American Airlines the situation was very similar, with a matching rate of 49%, as 72 of the 147 applicants received a match. In both cases, however, large numbers of employees who turned out for the SFCS events declined to sign up for the rideshare database citing as the reason their belief that it would be impossible for them to find a carpool partner. This perception is not easy to overcome and TMO staff should be prepared to counter the pessimism with data showing the actual matching rates for similar, or if at all possible, the same employer.

Previous research indicates that measures that increase the cost of parking (such as instituting parking charges) or limit its availability (such as restricting parking) have a significant positive impact on TDM program effectiveness [5, 7]. It is also well established that the availability of plentiful, convenient, free or low-cost parking plays a major role in promoting and perpetuating the use of SOV [15, 16, 17, 18]. While several employers designated special, more convenient parking spaces for car and vanpools, our discussions with employees participating in SFCS Day events indicate that this was not an effective inducement for shifting one's mode of commuting. On the other hand, while none of the employers included in this study implemented any strong parking control measures (such as those discussed in the literature), the experience of Tiger Direct provides some support for the findings of previous studies that limiting or imposing a cost on parking can be an effective strategy for increasing the number of employees commuting to work via alternative modes of transportation.

As the case of Radisson Bahia Mar reveals, it is very important for TMO staff to have quite a bit of information about the employees at any site where they are planning to stage

a recruiting event. In this case, meeting the linguistic needs of the employees was a crucial element of a successful event. This is a problem that is specific to public-private endeavors as employers that are developing their own TDM programs are certain to have this information and take account of it.

All in all, this study reveals that public-private partnerships for promoting TDM present certain challenges that are different from those faced by either employers or regional TMOs acting independently of each other to put in place TDM programs. For this reason, public-private partnerships need to be studied more extensively. Replication of this study's findings, whether qualitative or quantitative will enhance their validity and reliability. Additional valuable information is likely to be gathered from larger studies or from studies conducted in a geographic region that is different than the heavily urbanized tri-county area of Southeast Florida. Such information can be extremely useful to regional TMOs as it can help them design more effective approaches to public-private partnerships and utilize their resources more efficiently.

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