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USE OF PUBLIC TRANSPORTATION BY AIRPORT PASSENGERS

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ABSTRACT

Transportation plans in some communities have focused on providing rail service to the local airport, while other communities have emphasized bus and van service. This paper reviews the opportunity for rail, bus, and van service at U.S. airports and the use of these services by airline passengers at large airports in the United States and overseas. Based on airline passenger mode share data presented in this paper, there appears to be a "ceiling" on the market for public transportation (rail, bus, and shared-ride vans) at airports in the United States. The ceiling on public transportation use by airline passengers in most cities appears to be about 10% to 15%, even at airports with rail service. The primary, potential market for rail service is passengers with trip ends in downtown areas (or other areas well served by rail), travelling alone and with little no baggage, familiar with the rail service, and able to walk from the rail station to their final destination. In many cities the objectives of transportation planners and airport operators (i.e., encouraging the use of efficient access modes) might be best served by transportation plans that focus on bus or van services.

KEY WORDS

Airports, transit, public transportation, rail transit

INTRODUCTION

Airports are among the largest activity centers in most regions and often generate a greater number of trips than the downtown of the largest city in the region. For many years transportation planners and airport operators have sought to promote the use of efficient access modes by airline passengers and airport employees to reduce traffic volumes on roadways providing regional access to airports and internal circulation at airports. Transportation plans in some communities have emphasized providing rail service to the airport, while other communities have emphasized bus and van service. This paper reviews the opportunity for rail, bus, and van service (i.e., shared-ride, door-to-door van service) at U.S. airports and the use of the bus and rail services by airline passengers at large airports in the United States and overseas.

The mode share data presented in this paper are the result of recent research conducted as part of Transit Cooperative Research Program Project B-18, Improving Public Transportation Access to Large Airports. The data represent the most recent data available on the use of transit by airline passengers at large airports (the top 40 U.S. airports ranked by the number of originating passengers).

The data have been reviewed by the individual airport operators and organized to assure a consistent use of ground transportation services definitions. The definitions used are as follows:

1. **Private vehicles.** Vehicles used to transport airline passengers or visitors (e.g., family members, employees, friends, or clients), typically at no cost to the passenger, which are privately owned and privately operated.

2. **Rental cars**. Vehicles used to transport airline passengers or visitors, which are leased by the passenger (or visitor) from an agency doing business at or near the airport and rented for the duration of the passenger's trip. Vehicles rented under a long-term lease (i.e., greater than 3 months) are considered private vehicles, not rental cars.

3. **Courtesy vehicles**. Door-to-door, shared-ride transportation provided for customers of hotels, motels, rental car agencies, parking lots (both those privately operated and airport-operated), and other services. Typically, no fare is charged because the transportation service is considered part of (or incidental to) the primary service being provided. Service is provided using a variety of vehicles, including full-size buses, minibuses, vans, and station wagons.

4. **Airline crew vehicles**. Shared-ride transportation between airports and hotels provided for airline crew members by the employer at no charge. Service is provided using a variety of vehicles, including full-size buses, minibuses, vans, and station wagons.

5. **Taxicabs**. Privately operated door-to-door, on-demand exclusive transportation (i.e., for a single party, typically up to five persons). Fares are typically calculated according to trip length and travel time using a taximeter and according to rates established by a city or county licensing agency (e.g., a taxicab commission or public services commission), but may be zone fares, flat fares (predetermined fares between certain points such as the airport and downtown), or

negotiated fares. Typically, the fare is for use of the entire vehicle, although some communities allow extra fares per passenger or piece of baggage.

6. **Town cars (on-demand limousines)**. Privately operated door-to-door, on-demand ground transportation services that typically charge premium fares calculated on a per-mile and per-hour basis, available at the curbsides of some airports. These exclusive transportation services are typically provided using luxury town cars/sedans or limousines. Most often, on-demand limousines are provided when local taxicabs do not provide the desired level of passenger service.

7. **Pre-arranged limousines**. Door-to-door services providing exclusive transportation requiring prior reservations. Fares may be flat, calculated on a per-hour basis, or negotiated, regardless of the number of persons transported, according to rates approved by local or state licensing agencies. Such agencies sometimes also specify the geographic area that can be served and the tariff (or maximum fee) that can be charged. Pre-arranged limousine services are typically provided using luxury sedans or stretch vehicles, and include private car services ("black cars"), luxury limousine services, and suburban taxicabs (i.e., pre-arranged taxicab service provided by an operator not licensed to provide on-demand service at the airport). These services typically require prior reservations, but may also be dispatched by radio requests. Pre-arranged limousines are not permitted to respond to hails or on-demand requests for transportation.

   Privately owned and privately operated luxury limousines are considered private vehicles, as are those operated or leased by a corporation. However, most surveys do not distinguish between privately owned and other types of limousines.

8. **Chartered buses and vans**. Door-to-door services providing exclusive transportation requiring prior reservations. Fares are typically calculated on a per-hour basis regardless of the number of persons transported, according to tariffs approved by local or state licensing agencies. Chartered bus/van services are provided using buses, mini-buses, and vans (seating eight or more passengers), and include tour buses, cruise-ship buses, and other pre-arranged transportation for more than five passengers.

9. **Shared-ride, door-to-door vans**. Shared-ride transportation door-to-door services, which charge customers a predetermined flat fare per passenger or zone. Typically, transportation from the airport is on-demand, while transportation to the airport requires prior reservations. Vehicles may be licensed as shared-ride vans, airport transfer vans, or, in some communities, as taxicabs or pre-arranged/chartered vans. In most communities, the service is operated using radio-dispatched, eight-passenger vans.

10. **Scheduled buses**. Scheduled service operating to established stops or terminals, typically on a scheduled basis, along a fixed route that charges a predetermined flat fare per passenger or zone. In many communities there are two classes of bus service:

    - ***Express (including semi-express) transportation*** between the airport and major destinations in the region, often provided by a private operator licensed by state or regional agencies, but provided, in some communities, by a public operator. These services are often referred to as "airporters."

    - ***Multi-stop transportation*** between the airport and the region, typically operated by a public agency (i.e., traditional bus service).

11. **Rail service**. Fixed-route rail service operating to established stops or terminals on a scheduled basis. Customers are charged a predetermined flat fare per passenger or zone. Types of trains used to provide this service include light rail, commuter rail, and rapid transit.

For purposes of this paper, public transportation services are defined as those that are available to the general public and intended to transport more than one passenger or small group of passengers travelling together. Thus public transportation includes rail, express and multi-stop buses, and shared-ride/door-to-door vans, but excludes courtesy vehicles, pre-arranged limousines and charter buses/vans, taxicabs, rental cars, and private cars. In this paper these excluded modes are referred to as private vehicles/non-public transportation.

USE OF RAIL SERVICE

Direct rail service (i.e., those with stations at or within walking distance of the terminal building) is available at eight airports in the United States. As shown in Figure 1, the U.S. airport with the largest share of rail ridership is Reagan Washington National, where 14% of all passengers use rail. At both Hartsfield Atlanta and Midway (Chicago), about 8% of all passengers use rail, while 4% use rail at O'Hare (Chicago). Rail service is used by fewer than 3% of all passengers at the other four airports that have direct rail service (Baltimore/Washington, Cleveland Hopkins, Philadelphia, and Lambert-St. Louis international airports).

Direct rail service is available at more than 16 cities in Europe and Asia. As shown in Figure 2, rail is used by over 30% of the airline passengers at the airports serving Oslo (Gardermoen), Tokyo (Narita), Geneva, Zurich, and Munich (Franz Josef Straus). A larger proportion of passengers use rail at European and Asian airports than at any U.S. airport, with a few exceptions (e.g., Orly, Manchester, and Barcelona).

Shuttle bus service to rail stations at or near airports is available at 11 large U.S. airports. These airports include those serving Fort Lauderdale, Los Angeles, Miami, Newark, New York (John F. Kennedy International and LaGuardia airports), Oakland, San Francisco, San Jose, and Washington (Dulles International Airport). As shown in Figure 1, the airports with largest proportion of passengers using shuttle bus to rail service are Boston-Logan (5.5%) and Metropolitan Oakland (4.1%). At the other nine airports, 1% or fewer of the passengers used rail service.

OPPORTUNITY FOR RAIL SERVICE

Rail ridership is greater at overseas airports in part because of the significant reliance on rail in European and Asian cities as the dominant form of public transportation, and the extensive inter-city (or regional) and intra-urban networks. In several cities (e.g., Oslo, Geneva, Zurich, Munich, and Frankfurt), rail serves as the feeder connection to long-haul flights, much as commuter and other short-haul flights connect to long-haul flights in the United States. For these and other reasons, as discussed in subsequent paragraphs, the factors that allow rail to attract large market shares at the European and Asian airports are not directly transferable to conditions in most cities in the United States.

In the United States, there appears to be a limited market for public transportation at airports. The "ceiling" on public transportation use appears to be about 10% to 15%, even at airports with rail service. Public transportation use exceeds 15% at only three U.S. airports—those serving San Francisco (21.0%), Boston (18.6%), and Washington, D.C. (Reagan Washington National) (17.5%). Public transportation use by airline passengers exceeds 10% at the airports serving New Orleans, Denver, Los Angeles, Las Vegas, Seattle-Tacoma, Orlando, and Chicago (Midway). Thus, 90% or more of all airline passengers are using private or non-public transportation access modes at most airports, including those with rail service.

Numerous studies have documented the characteristics required for a successful rail system. Key factors affecting the use of rail service have been shown to include (listed in the order of their estimated importance):

- **Proportion of airline passengers with trip ends in downtown**. For example, at Reagan Washington National Airport about 33% of all passengers have trips ends in the downtown area. Other airports where large proportions of passengers have downtown trip ends include those serving Boston, Chicago, New York, and San Francisco. At most airports, fewer than 15% and more likely only 10% of all airline passengers have trip ends in the downtown area. Thus, in most communities the geographic service area directly served by a downtown rail service represents a relatively small percentage of the total airline passenger market.

- **Characteristics of passenger market**. Passengers with little or no checked bags are more likely to use rail service. Large family groups are less likely to use rail. Thus, airports serving a high proportion of business trips (e.g., Atlanta International and Reagan Washington National airports where over 64% of the passengers are making business-related trips) are more likely to attract rail users than those serving tourist destinations (e.g., Las Vegas and Orlando, where less than 30% of the passengers are making business-related trips). The proportion of passengers familiar with regional transit system and familiar with the system (e.g., understand the schedules and how to purchase a ticket) are also important.

- **Regional travel time.** The availability of direct service between the airport and downtown (or major activity centers) allowing passengers to avoid transfers or multiple stops is

important. Passengers travelling between the airport and downtown encounter 6 to 9 station stops at Reagan Washington National Airport versus 15 or more stops on less successful rail systems. As evidenced by the data, passengers tend to use rail service when they are concerned about (1) unreliable travel times on access roadways or encountering traffic delays enroute to the airport and (2) the lack of convenient parking at the airport and the need to search for an available space.

- **Ability to walk between station and destination**. Passengers may find using rail service more attractive if their final destination is within walking distance of the station, and less attractive (and less convenient) if they must transfer to a second mode (e.g., a bus or taxicab) to travel to/from the station. The need for rail passengers to wait for and transfer to a second mode may provide a travel time advantage for door-to-door services.

- **Extensive regional coverage**. A comprehensive rail network, serving a large catchment area, will serve a larger potential market and provide passengers with more travel opportunities (e.g., those who may wish to leave from their place of work and return to their home) than does a rail system consisting of a single line between downtown and the airport.

- **On-airport travel time.** The time (and distance) passengers are required to travel between the station and their gate is also important. It is easier to provide convenient rail service at airports that have a single terminal (e.g., Hartsfield Atlanta International or Midway airports) than at airports with multiple terminal buildings (e.g., John F. Kennedy, Boston-Logan, or Charles DeGaulle international airports) where passengers must use intermediate shuttle buses or people movers to travel to the rail station. However, at Cleveland Hopkins International, which has a single terminal building and a well-designed station, the existing rail service has not attracted a large market share.

- **Frequency of service**. Waiting times of 10 minutes are preferred. The rail service at one U.S. airport operates on 30-minute headways, while a taxicab ride downtown at the same airport requires only 15 to 30 minutes. The availability of late night and weekend service is also important.

- **Availability of parking at non-Airport stations**. Many transit agencies prohibit overnight parking at stations, discouraging passengers who may wish to leave their car at the rail station for their duration of their trip.

The ceiling on the use of public transportation appears to be higher (about 35%) at European and Asian airports. Public transportation market shares are higher than 35% at three European and two Asian airports—the airports serving Oslo (63%), Hong Kong (60%), Tokyo (59%), Geneva (45%), London (Heathrow) (40%), and Munich (38%). It appears that these data are not transferable to the United States because of the extensive public transportation networks, limited highway access (e.g., Hong Kong or Oslo), regional population densities, and the use of rail as a feeder service.

Only a few cities in the United States have the airport user characteristics, have the appropriate airport configuration, and have (or are planning) a rail network that conforms to characteristics of a successful rail system described above. At most U.S. airports, the potential market for rail service is very limited—passengers (1) with trip ends in the downtown or areas well-served by rail, (2) travelling alone and with little or no baggage, and (3) familiar with the rail service (and schedules). Thus, despite the success of rail service in Europe and Asia, it would appear that rail, particularly investments in a new rail service, make sense in a relatively small number of U.S. cities.

Currently transportation plans are being prepared to provide rail service to airports in over 30 U. S. cities through extensions of existing rail networks or new starts. At many of these communities, the objectives of transportation planners and airport operators (i.e., encouraging the use of efficient access modes) might be better served by transportation plans that focus or bus or van services.

USE OF BUS AND VAN SERVICES

Figure 1 depicts the use of bus and van service at 33 large U.S. airports. As shown, five of these airports have public transportation market shares that are higher than the airports with direct rail service or shuttle service connection with rail (excluding Reagan Washington National Airport). These airports (and the public transportation market share) include New Orleans (16%), Denver (14%), McCarran (Las Vegas) (12.6%), Seattle-Tacoma (12%), and Orlando (11.5%) international airports.

At more than 10 airports, express buses are used by more than 5% of the airline passengers. These airports include those serving Baltimore, Boston, Denver, Indianapolis, Los Angeles, Newark, New Orleans, New York (John F. Kennedy International and LaGuardia), Oakland, San Francisco, and Seattle. Shared-ride, door-to-door services are used by more than 5% of the airline passengers at 6 of the 33 large airports. These airports include those serving Los Angeles (12.5%), San Francisco (12.0%), Orlando (11.5%), San Diego (9.0%), Tampa (7.0%), and Denver (6.3%), and Sacramento (5.0%).

Data available from European airports indicate that 10% or more of the passengers use bus services at the airports serving Hong Kong (36%), Tokyo (23%), Oslo (20%), London (Heathrow and Gatwick international airports) (15%), Paris (Chares de Gaulle) (11%), Brussels (10%), and Geneva (10%). At several of these airports, publicly or privately sponsored express buses serve specific markets (e.g., the Logan Express in Boston and the Van Nuys FlyAway in Los Angeles). In Europe, bus service is often coordinated with or operated by the airlines (e.g., Lufthansa regional bus service at Frankfurt or the Roissybus provided by Air France).

OPPORTUNITIES FOR BUS AND VAN SERVICES

Airline passengers represent a unique market that differs from traditional daily commuters. Compared with daily commuters, airline passengers are typically more time sensitive and less cost sensitive, have more baggage, use the transit system less often, and are more likely to use the system outside of normal commute hours.

It is often easier to design a special bus or van service to respond to this market than try to adapt a commuter-oriented, multi-stop bus (or rail) service to meet the needs of daily commuters and airline passengers. Door-to-door van and express bus services are examples of airport access modes that respond to the desire of airline passengers for greater convenience and faster travel times than are typically offered by multi-stop bus services. Operators of rail service prefer not to have airport-dedicated vehicles (e.g., with special baggage racks), because these special vehicles reduce their flexibility in the use of equipment. Airport-dedicated buses and vans represent a smaller investment, and are generally more acceptable to an operator.

The primary sources for ridership on new rail services are passengers who previously used existing rubber-tired public transportation. Available studies report that over 80% of the airline passengers using new rail services previously used buses, vans, or taxicabs. Thus, the introduction of rail service does not appear to significantly raise the public transportation ceiling, but rather promotes the diversion of airline passengers from one public transportation mode to another.

At some airports, specialized bus and van services have proved successful. These services include those that offer door-to-door transportation at lower costs than taxicabs, or express bus services that are designed to attract specific geographic markets (e.g., the Van Nuys FlyAway or Boston Logan Express services). These specialized services tend to attract passengers who would have otherwise used private vehicles.

Bus and van services, particularly privately owned services, operate in a different environment than rail services. While a few express bus services are publicly operated or subsidized by an airport operator, most bus services and all shared-ride van services are privately operated.

Private operators are required to (1) obtain an airport permit in order to pick up passengers at an airport, (2) abide by airport regulations, and (3) pay established fees. The fees a private operator is required to pay can be calculated as a percent of the operator's revenues (e.g., 15% of gross revenues) or on a per-trip basis (e.g., $1.00 per trip). Public transit agencies are usually exempt from such airport fees, and may even receive subsidies from the airport operator.

At some airports, the business relationship between the airport operator and the privately operated transportation service is identical to the form of the business relationship used for major airport concessionaires (e.g., rental cars and in-terminal food and beverages services). At other airports, any bus or van operator properly licensed by the city or state can pick up passengers; this often results in an imbalance between the demand for public transportation and the number of providers.

As with rail systems, numerous studies have documented the requirements for a successful bus and van transportation service. At an airport, the key factors (listed in estimated order of importance) affecting the use of bus and van services include:

- **Door-to-door transportation**. Many airline passengers are willing to pay additional fares for the convenience offered by door-to-door services because they value travel time (particularly reliable travel time) more highly than travel costs. Such services also allow passengers to avoid transferring between airport access modes.
- **Express bus service**. Express bus services, particularly those that offer travel time savings and service from intercept lots near regional access roads have proven attractive to specific airline passenger market segments.
- **On-airport travel time.** The time (and distance) that passengers are required to travel between the terminal and the boarding area are important considerations. The service should minimize the time passengers spend waiting in the vehicle while (1) their vehicle makes multiple curbside stops or (2) a van driver seeks additional customers. As with rail systems, a single airport terminal building allows better levels of service (i.e., fewer stops and faster travel time) than does an airport with multiple terminals or bus stops.
- **Pickup/drop-off locations**. To best serve the needs of passengers, drop-off locations should be located immediately adjacent to ticket counters and pickup should occur next to baggage claim areas, preferably in areas reserved for buses, vans, and other commercial vehicles. Private vehicles should be prohibited from entering these areas to avoid conflicts between maneuvering vehicles and waiting or boarding passengers.
- **Frequency of service**. The availability of off-peak, late night, and weekend service is also important as many airline passengers travel during non-commuter hours (e.g., the peak hours at many airports are on 11 a.m. to 1 p.m. on weekdays).
- **Regional travel time**. The availability of high occupancy vehicle lanes on airport access routes can allow bus and van services to offer a greater travel time saving than private vehicles. The ability to stop at major activity centers, and avoid the need to use a second, connecting travel mode at the non-airport end of the trip, is an advantage.

- **Form of competition**. The measures used to control competition between bus, van, and other rubber-tired services (e.g., taxicabs and limousines) are important. In an open market, a legitimate operator offering high quality service will find it difficult to compete financially with an operator who uses (1) vehicles that are improperly maintained and lack proper insurance, and (2) owner-operator drivers who lack proper training and are encouraged or required to improperly solicit business.

- **Extensive regional coverage/passenger characteristics**. The proportion of airline passengers whose trip ends are near the bus stops/stations establishes the size of the potential market. The degree of population density and automobile ownership may also influence the use of door-to-door service. For example the proportion of passengers using shared-ride vans at San Francisco International Airport is much higher than the proportions at Metropolitan Oakland or San Jose international airports, perhaps due to the greater population densities and lower automobile ownership rate in San Francisco.

Although not addressed in this paper, airport employees represent a major potential market for bus and rail service. Many of the factors described above are also applicable to employees. However, two key considerations are (1) the availability of service to areas where employees live (which are often in the opposite direction from downtown and the traditional transit corridors), and (2) the frequency of service during late night and weekends (due to employee working hours and shifts).

CONCLUSION

In the United States, there appears to be limited market for public transportation (rail, bus, and shared-ride vans) at airports. The ceiling on public transportation use in most U.S. cities appears to be about 10% to 15%, even at airports with rail service.

At most U.S. airports, the primary, potential market for rail service is passengers with trip ends in the downtown area (or other geographic areas well served by rail), travelling alone and with little or no baggage, and familiar with the rail service (and schedules). Compared to European and Asian cities, there appear to be a relatively small number of U.S. cities that have the airport user characteristics, the

appropriate airport configuration, and the existing or planned rail network that are required to attract a large share (more than 5%) of the airline passenger market.

In many cities, the objectives of transportation planners and airport operators (i.e., encouraging the use of efficient access modes) might be best served by transportation plans that focus on bus or van services. Special bus or van services can be designed to respond to the airline passenger market more readily and often more cost-effectively (considering the large capital investment required to develop rail systems) than attempts to adapt a commuter-oriented, multi-stop bus (or rail) service to meet the needs of both daily commuters and airline passengers. Door-to-door vans and express buses are examples of such special services, and have attracted significant market shares at several large airports.

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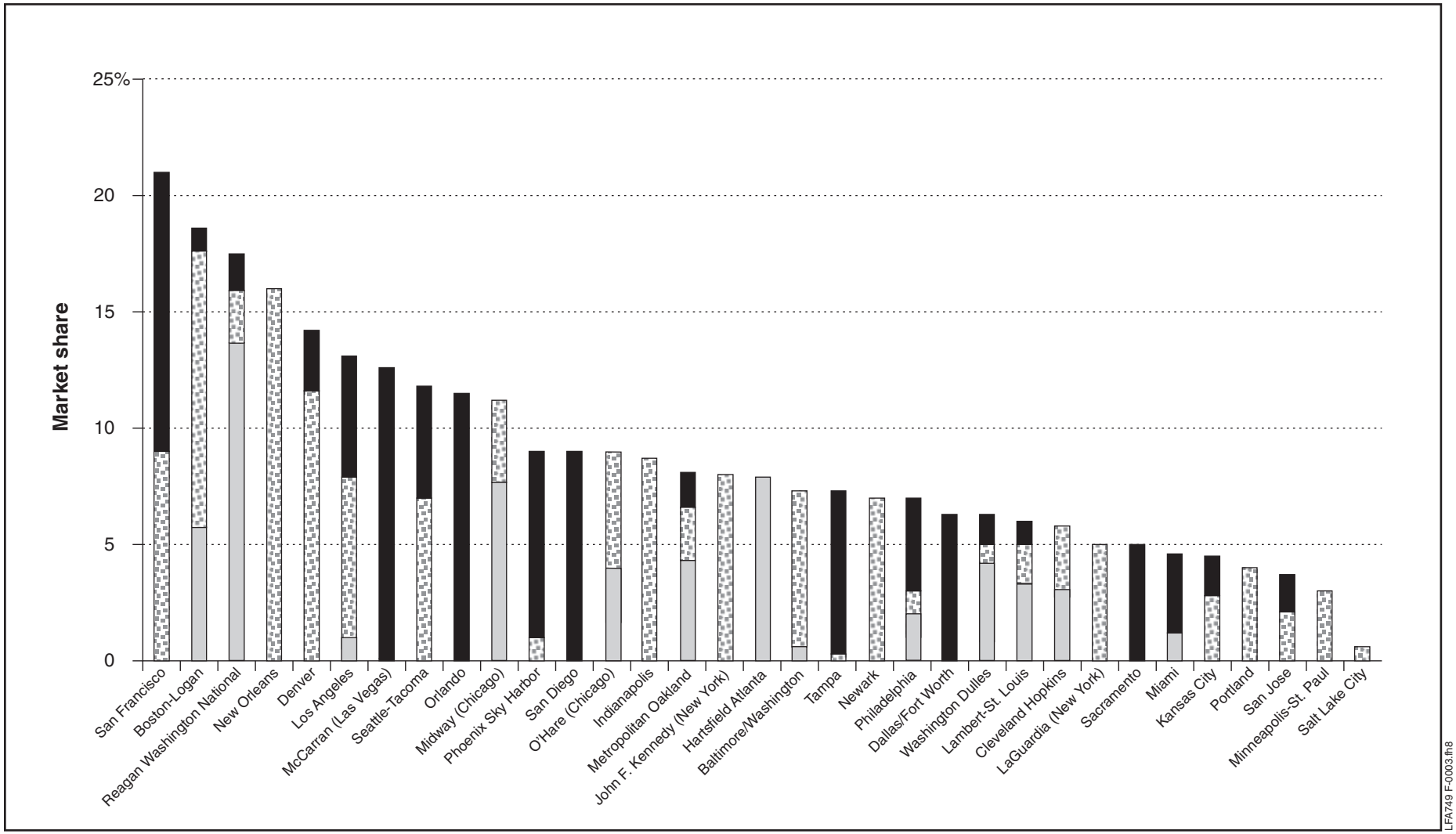

LEGEND

- Rail
- Buses
- Shared-ride vans

Source: Leigh Fisher Associates, based on information provided by airport management.

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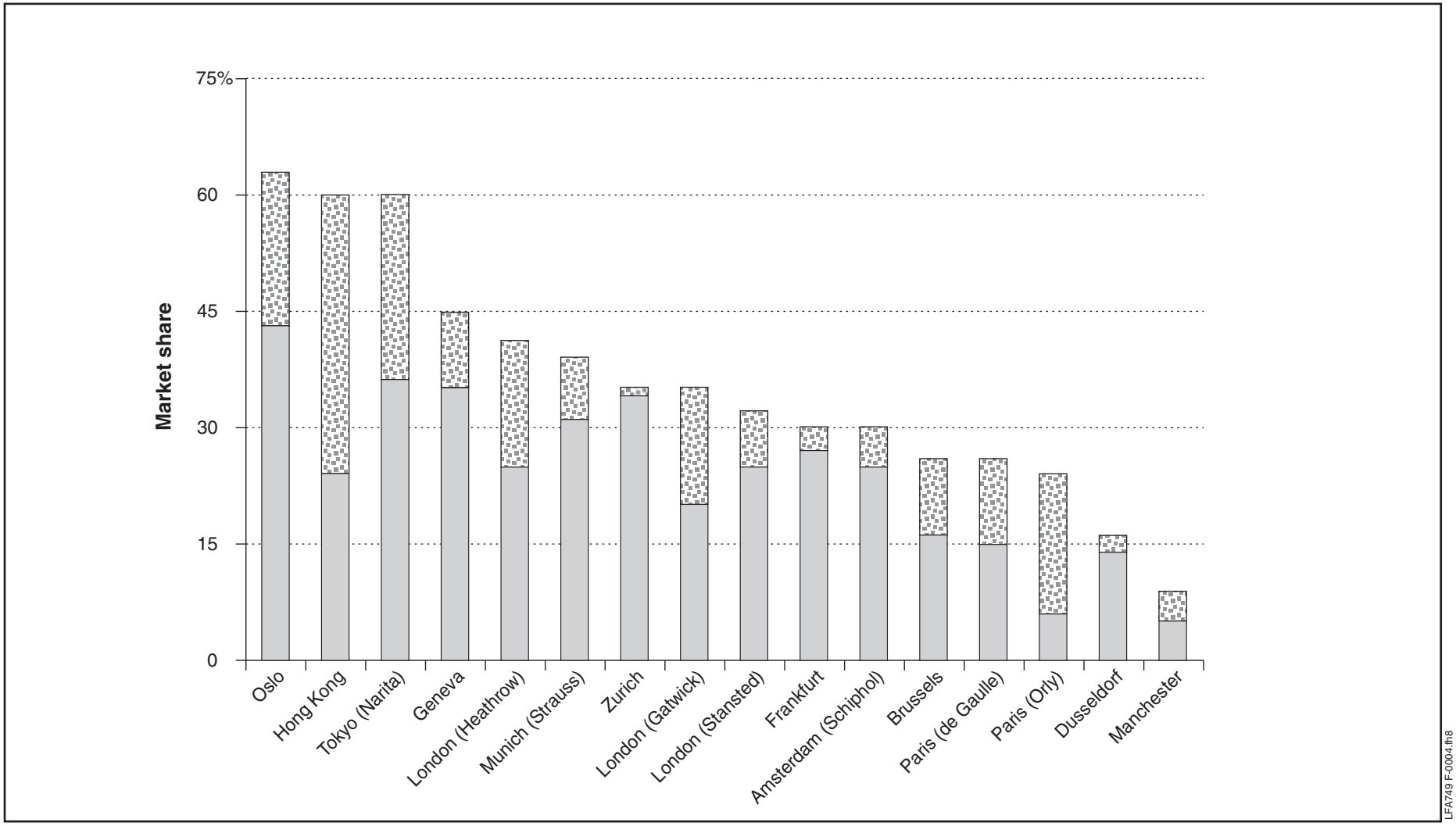
FIGURE 1

Public Transportation Market Share at Large U.S. Airports

May 1999



LEGEND

Rail

Buses

Source: Matthew A. Coogan, based on information provided by airport management.

FIGURE 2

Market Shares of Rail and Bus at International Airports

May 1999

LIST OF FIGURES