A Ridesharing Market Analysis Survey of Commuter Attitudes and Behavior at a Major Suburban Employment Center

LAWRENCE J. GLAZER AND DAVID A. CURRY

This survey was part of a project to prepare a transportation systems management plan for the Irvine Business Complex (IBC), a developing, suburban employment center 50 miles south of downtown Los Angeles. Because manufacturing and warehousing employees were undersampled, there may be some bias in the survey results. About 90 percent of the respondents were driving to work alone. The average commuting distance was 12 miles one way. Average commuting time was about 30 minutes, each way. The trip-length distribution was quite similar to that of the Los Angeles region. More than three-quarters of the commuters started work between 7:30 and 8:30 a.m. About 60 percent left between 4:00 and 5:30 p.m. Only 12 percent of this white collar work force had schedule flexibility of more than 30 min. Almost two-thirds felt that commute traffic was growing worse. Free parking was enjoyed by 94 percent of respondents; parking was abundant. The average duration of employment in the IBC was almost 3 years. More than two-thirds of the survey respondents were female. The five most common reasons cited for not ridesharing were (a) Prefer freedom of driving alone (43 percent); (b) Might need car due to overtime (42 percent); (c) Need car for business (32 percent); (d) Run other errands en route (30 percent); and (e) Irregular working hours (26 percent). However, 41 percent of the solo drivers expressed positive attitudes toward using some other commute mode, and 11 percent requested ridesharing information. Combining ridesharing with the other demand management techniques of parking management, work rescheduling, and telecommuting, the market shares of which are harder to quantify, the maximum potential market share or participation rate will likely be between one-half and two-thirds of all IBC commuters.

The Irvine Business Complex (IBC) is a 2,270-acre site of intense commercial and industrial uses adjoining the John Wayne Airport in Irvine, about 50 mi south of Los Angeles. The current zoning allows construction to a ceiling of almost 35 million ft² (MSF) of office-equivalent space. Requests are currently under consideration for increasing this ceiling by up to 14 MSF more. About 18 MSF are in place, and roughly 1.5 MSF are being added each year.

Current employment of around 60,000 persons in the IBC is expected to grow to about 117,000 by the year 2000, without the increase in development limits. The resulting employment center will be one of the largest in the U.S. outside a central business district. There is already heavy commute-period traffic congestion in the IBC. Even with the $120 million of traffic improvements anticipated, traffic will exceed available street and intersection capacity.

L. J. Glazer, Crain & Associates, Inc., 2007 Sawtelle Blvd., Suite 4, Los Angeles, Calif. 90025. D. A. Curry, Crain & Associates, Inc., 343 Second St., Suite F, Los Altos, Calif. 94022.

This survey was conducted as part of a project to prepare a transportation system management (TSM) plan for the IBC, a developing employment center in Irvine, California. Data were needed describing the current commuting modes of people working in IBC. Data available from the 1980 U.S. census were questionable because they were taken shortly after a major gasoline shortage in Southern California, and because the nature of employment in the IBC has shifted from manufacturing and warehousing to white-collar office work. Although this survey was not originally planned as part of this project, the need for new baseline data led to the undertaking of a modest survey effort in late 1985 and early 1986.

The survey was conducted by Crain & Associates, Inc., with the assistance of five members of the IBC Advisory Group, representing the following organizations: the city of Irvine, American Hospital Co., Irvine Co., Koll Co., and Douglas Plaza. The last three organizations, which act as property managers for large developments within the IBC, enlisted the cooperation of a number of their tenants to distribute surveys to employees who regularly work in the IBC. The same channels were used to collect the completed surveys. American Hospital Co. supplied data from company files and from a recent survey conducted by Commuter Network, the regional ridesharing program.

A brief, self-administered, written survey was developed. The instrument and all distribution and collection procedures were pretested at three companies. The pretest was successful, with only minor wording changes necessary, so all pretest data were included in the final data set.

About 2,000 surveys were distributed to participating companies. In most cases, records were not kept of the number of surveys passed out to employees. In the few cases for which records were kept, the response rates varied from about 30 percent to nearly 50 percent. A sample cover letter was sent to participating companies, and each of them modified the letter to fit their situation. Approximately 750 completed surveys were received.

Each completed survey was first visually scanned for errors. Survey responses were coded onto the right-hand margins of the survey forms, and coded data were then key-entered into a computer. On-line edit checks were used to intercept coding and keying errors as the data were being entered. Tabulations were produced using Informix, a database software package, and Multiplan, an electronic spreadsheet software package. All editing, keying, programming, and analysis were done by Crain & Associates staff.

Because of the extremely limited budget for this unexpected survey, it was not possible to use a systematic or random sampling technique to produce a reliably representative cross section of IBC commuters. Rather, companies were selected from the tenant rosters of the participating property managers, with an attempt to identify a representative mix in terms of business categories and occupational types. However, there were not enough manufacturing or warehousing tenants available and willing to cooperate.

Therefore, there is a likely bias in the survey results. Because manufacturing and warehousing employees will generally have more regular hours and lower disposable incomes than the professional and office employees in the rest of the IBC, they are more likely to choose lower-cost housing farther from the IBC and more likely to use ridesharing modes because of the long commuting distances, lower disposable incomes, and regular schedules. Thus, it is possible that the current ridesharing mode shares estimated in this report may be understated (by a few percent at most). A much more extensive survey would be required to know for sure.

However, the mix of employment in the IBC is shifting strongly away from manufacturing and warehousing. Thus, these biased survey results may indeed be more applicable to the future employment mix in the IBC than if they had been based on a truly representative sample.

PRESENTATION AND INTERPRETATION OF RESULTS

In this section the survey results and discussion of responses to each question are presented in the order of their appearance on the questionnaire.

1. How long have you worked in Irvine?

The average duration was almost 3 years (34 months). About half have worked in Irvine for 2 years or less. To the nearest month, the quartiles were as follows:

1st quartile (25 percent): 11 months or less
2nd quartile (56 percent): 24 months or less
3rd quartile (77 percent): 48 months or less

Further, 8 percent had worked in Irvine for 8 years or more.

2. Where do you work?

Company Name	*No. of Respondents*
Irvine Co.	64
Chubb	29
Digital	79
American Savings	60
Merrill-Lynch	40
MCI	57
Citicorp	33
Burlington Northern	169
Prime Computer	26
Association of Administrators & Consultants	11
Gulf Insurance Co.	12
Shearson-Lehman Mortgage Corp.	32
Control Data Corp.	34
Century 21 Headquarters	86
Total	732

As noted earlier, this sample underrepresented the manufacturing and warehousing sector of the current IBC. However, this sample may be representative of the IBC in the future.

3. What is your occupation?

Response	*No.*	*Percentage*
Clerical/secretarial	243	34
Managerial/supervision	184	26
Professional	117	17
Sales/installation	96	14
Technical/research	32	5
Services	32	5
Other	2	0
Total	708	101
No Response	24	–

4. What is the zip code where you live?

The purpose of this question was to identify where IBC workers live by county and, more importantly, their commuting distances. The distribution by county was as follows:

County of Residentce	*Percentage*
Orange County	88
Los Angeles County	8
Riverside County	1
San Bernardino County	2
San Diego County	1

To obtain commuting distance, a zip code map was used to measure the distance from the IBC to the population centroid of each home zip code reported. This airline distance was then multiplied by 1.2, a factor commonly used to convert to roadway distance. The salient findings follow.

Average commuting distance: 12 mi one way
1st quartile (25 percent): 4 mi or less
2nd quartile (50 percent): 9 mi or less
3rd quartile (75 percent): 14 mi or less

This distribution is quite similar to the trip-length distribution for the entire region, according to LARTS surveys.

Approximately 13 percent of these respondents commuted 20 mi or more to work one way. This percentage is also similar to that of the entire region. This 20-mi threshold is generally the minimum viable distance for vanpools serving sururban work sites with free parking. Thus, there is a sizable potential market for vanpools to the IBC, as was expected.

5. How long does it usually take you to get to work?

Average commuting time: 31 min (each way)
1st quartile (26 percent): 18 min or less
2nd quartile (48 percent): 28 min or less
3rd quartile (74 percent): 38 min or less

Eight percent of these commuters reported trip times of 1 hr or more, each way. With an average commuting time of 31 min and an average distance of 12 mi, this implies an average travel speed of about 24 mph.

6. What hours do you normally work?

Almost all respondents cited a time on the hour or half-hour. The salient characteristics of the start-time and end-time distributions are as follows. One-third of all respondents start

work at 8:00 a.m. More than three-quarters start work between 7:30 and 8:30 a.m. This defines a sharp peak of traffic demand in the morning. About 40 percent of all respondents end work at 5:00 p.m. About 60 percent leave work between 4:30 and 5:00 p.m. This defines an even sharper traffic peak in the afternoon.

Actual traffic demand on IBC streets, however, will not display such sharp peaks because half of the traffic on IBC streets is through traffic, not destined to the IBC. Still, this sharp peaking of IBC traffic demand suggests a significant potential for work-rescheduling measures such as staggered work hours, adjustable work schedules, or flextime.

7. How flexible is your work arrival and departure time?

Response	*No.*	*Percentage*
Not flexible	207	29
5 to 15 min	261	36
16 to 30 min	170	23
More than 30 min	86	12
Total	724	100
No response	8	–

In spite of the fact that IBC employment is predominantly white-collar office work that is highly compatible with alternative work schedule programs, there is no more schedule flexibility in the IBC than elsewhere. Thus, there appears to be significant opportunity for work-rescheduling measures to manage traffic demand on Irvine streets. This conclusion does not apply to freeways, however, because their peaks are much broader.

8. How would you rate traffic flow conditions on the streets of Irvine during your commute to or from work? (City streets only, not freeways.)

Response	*No.*	*Percentage*
Very good	26	4
Good	115	16
Average	312	43
Poor	204	28
Very poor	68	9
Total	725	100
No response	7	–

Slightly more than one-third gave a negative rating (poor or very poor) to traffic flow on Irvine streets, whereas almost one-half appeared neutral (average).

9. Is commute traffic on Irvine streets getting better or worse lately?

Response	*No.*	*Percentage*
Getting better	27	4
About the same	231	32
Getting worse	457	64
No response	17	–

Evidently, most IBC commuters felt present traffic conditions were not bad, but expected traffic to get worse in the future. It would be informative to track these perceptions over time, perhaps every 2 or 3 years.

10. Do you pay for parking at work yourself?

Response	*No.*	*Percentage*
No	687	94
Yes	40	6

If yes, how much?

Response ($)	*No.*
10/month	1
15/month	29
16/month	1
22/month	1
30/month	1
40/month	3
50/month	1
5/day	1
No response	2

Almost all IBC commuters park for free (to them).

11. Do you have trouble finding a parking space when you arrive at work?

Response	*No.*	*Percentage*
Never	334	46
Sometimes	288	40
Often	71	10
Always	35	5
No response	4	–

Only 15 percent have frequent problems finding a parking space at work, and almost half never have a problem. A number of respondents added comments to the effect that their only parking problem is finding a space during lunchtime.

12. Are you aware of anything that your employer does to encourage you to use carpools, vanpools, or buses?

Response	*No.*	*Percentage*
No	695	97
Yes	21	3

If yes, what?

Response	*No.*
Post ridesharing information	5
Adjustable work hours	4
Ridesharing materials	1
Bus information	1
No response	10

Corresponding data about the percentage of IBC firms that offer significant ridesharing incentives were not available, but was probably close to 3 percent.

13. Are you male or female?

Response	*No.*	*Percentage*
Female	492	69
Male	219	31
No response	21	–

More than two-thirds of the survey respondents were female. This distribution is certainly not typical of the regional

work force, but is not surprising given the office environment of the IBC and especially of the survey population.

14. How do you usually travel to work? Please write the number of days per week that you use each of the following ways of getting to work:

	Days per Week							
Mode	*7*	*6*	*5*	*4*	*3*	*2*	*1*	*0*
Drive alone	2	5	620	10	6	9	5	75
Drive or ride with others	0	0	50	4	10	3	9	656
Motorcycle	1	1	0	1	0	2	0	727
Bus	0	0	4	0	0	0	0	728
Vanpool	0	0	0	0	0	0	0	732
Bicycle	0	0	0	0	0	0	0	732

Because this question allowed respondents to give several modes, mode shares were calculated by counting the numbers of people citing usage of a given mode 3 days or more per week. On this basis, the current mode shares are

Response	*No.*	*Percentage*
Drive alone	643	90
Drive or ride with others	64	9
Motorcycle	3	0.5
Bus	4	0.5
Vanpool	0	0
Bicycle	0	0

About 90 percent of the survey respondents are currently driving to work alone, and only 10 percent are currently using some form of alternative commuting mode.

As mentioned previously, manufacturing firms were not sampled. To examine the effects of this bias, available data were obtained about two such firms from the files of Commuter Network, the local ridesharing program. These data, taken in response to a transportation survey distributed to all employees, found ridesharing rates of 15 and 19 percent among respondents from the two firms. Given this apparent sample bias, the actual current ridesharing rate in the IBC was estimated at about 12 percent.

15. What prevents you from using a bus, carpool, or vanpool? (Check all that apply.)

Response	*No.*	*Percentage*
Prefer freedom of driving alone	313	43
Might need car due to overtime	305	42
Need car for business	236	32
Run other errands en route	222	30
Irregular working hours	192	26
Anticipate many hassles with poolers	171	23
Don't know anyone to carpool with	139	19
Bus takes too long	126	17
Need car for business (4–5 days/week)	121	17
Drop off child enroute	94	13
Need car for business (2–3 days/week)	62	9
Need car for business (1 day/week)	33	5
Don't know how to take the bus	28	4
Costs less to drive alone	31	4
Other	57	8

This pattern of response is consistent with that of other surveys. The primary perceived barriers are desire for independence, irregular work schedules, and need car for business or personal reasons. Many respondents gave multiple reasons.

16. Which of the following means of commuting would you consider using, at least 2 days per week? (Check all that apply.)

Response	*No.*	*Percentage*
None of these	254	35
Carpool	224	31
Vanpool	139	19
Bus	63	9
Bike	24	3
Walk	1	0
No response	176	24

In this case, the "No response" was interpreted to be "None of these," with their combined total being 59 percent of those surveyed. Therefore, at least 41 percent of respondents now driving alone expressed positive attitudes toward using some alternative commute mode. Because this question was asked only of the 90 percent who were driving alone, this result means that about 36 percent of all survey respondents would consider using some form of alternative transportation. Adding to this fraction the approximately 10 percent who are already ridesharing produces a maximum potential market of about 46 percent.

17. OPTIONAL: If you would like to apply for a free list of other commuters who live and work near you and who are interested in carpooling or vanpooling, please fill in your name and address below. This information will be clipped from the survey form and sent to the Orange County Transit District Ridesharing Program.

	No.	*Percentage*
No response	651	89
Requested information	81	11

The percentage of respondents applying for a match list is low in comparison with those indicating some interest in carpooling from the previous question. However, 11 percent is an excellent response rate to a low-key invitation to apply for match lists embedded in a survey with no promotional campaign. The remaining interest group can be assumed either to feel less urgency about switching modes or to require more personal assistance in forming pools than those requesting immediate information.

CONCLUSIONS AND RECOMMENDATIONS

There does appear to be a substantial market for transportation demand management actions within the IBC—at least as good as the Los Angles region as a whole.

The IBC trip length distribution, with an average trip length of 12 mi, is quite similar to that of the entire region. This implies a substantial market for carpools, based on trip length.

Approximately 13 percent of these respondents commute 20 mi or more to work one way, a percentage that is also similar to that of the entire region. This 20-mi threshold is generally the minimum viable distance for vanpools serving a suburban work site with free parking. Thus, there is a sizable potential market for vanpools to the IBC, on the basis of trip length.

Because of the heavy concentration of work schedules close to the normal hours of 8 to 5, and because of the limited schedule flexibility of IBC employees, there appears to be significant potential for use of work-rescheduling measures such as staggered work hours, adjustable work schedules, or flextime to manage traffic demand on Irvine streets by spreading these sharp peaks. This conclusion does not apply to the freeways, however, because their peaks are much broader.

Because almost all IBC commuters park at no cost to them and the overall parking supply appears quite adequate, there are substantial opportunities for parking management actions, especially with respect to those that would transfer some of the cost for providing this parking from the employer to the commuter. Because much of the parking within the IBC is in structures, this cost is not small.

Although the survey did not directly explore the possibility of telecommuting programs, the high percentage of office-type occupations in the IBC suggests a likely fertile environment for such actions.

The most common reasons cited for not being able to rideshare are consistent with other surveys—the primary perceived barriers are desire for independence, irregular work schedules, and need of car for business or personal reasons. But 41 percent of the solo drivers did express positive attitudes toward using some alternative commute mode. Combining this positively disposed subset of solo drivers with those who are already ridesharing produces a maximum potential ridesharing market of about 46 percent, on the basis of current attitudes.

Combining ridesharing with the other demand management techniques of parking management, work rescheduling, and telecommuting, the market share of which is harder to quantify, the maximum potential market share or participation rate will probably be somewhere between one-half and two-thirds of all IBC commuters.

Because potential benefits appear to be achievable from all major demand management techniques, it is recommended that all be included to some extent in the TSM program for the IBC.