

SUMMARY

The foregoing analysis has shown how computer simulation in taxicab fleet operation serving major U.S. airports can assist airport policy officials in setting the appropriate number of taxicabs to serve their airport. Airport officials have the responsibility to ensure safe, economical, and dependable taxicab service and should manage this service. Concession agreements that limit the number of taxicabs to those that are economically viable to serve adequate airport passenger demand are simply an extension of good managerial practice on the part of the airport authority.

Through such mechanisms the actual taxicab fare

or rate is secondary when the productivity factor of the taxicab fleet is taken into consideration. Objectives of a fair taxicab driver income, good quality service, and adequate compensation to the airport facilities dedicated to taxicab services can be met through operational simulation of the fleet by simple computer programs such as TAXISIM and straightforward business cost analysis. The tools are simple and other airport managers are encouraged to consider their use.

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Comments on Airport Survey Methods Using Schiphol Airport in Amsterdam as an Example

WOLFGANG BLECHINGER, WERNER BRÖG, and H. W. B. MESSELINK

ABSTRACT

Airport surveys are necessary to collect the data needed to analyze and forecast air travel. In this paper Schiphol Airport in The Netherlands is used as an example to demonstrate that it is important to occasionally study and review both the methods used to conduct such surveys and the execution of the surveys themselves. The Schiphol Airport study showed that sampling procedures can cause considerable misrepresentations in the results of a survey. If the so-called last minute passengers are not adequately represented in the sample, for example, the number of persons making private trips is automatically overrepresented. Although it is difficult to interview these last minute passengers, this study shows that it is possible. If the proper methods are used, last minute passengers can be correctly represented in the sample and it is also possible to get them to answer the questions that are most important to the survey. Furthermore, the Schiphol Airport study proved that for normal airport surveys, self-administered questionnaires are not only less expensive than personal interviews, but that passengers also prefer this method of data collection and the results are more accurate.

The growth of air traffic in the late 1960s and early 1970s made the thorough investigation of the need for, and the impact of, a second national airport a matter of vital concern to the Dutch Civil Aviation Authority. It appeared that the Schiphol Airport would soon no longer be able to handle existing volumes of traffic. One of the major problems for researchers working on the project was the lack of adequate data.

Consequently, in 1972 surveys of flight passengers at Schiphol Airport were commenced to collect data on airline passengers. These surveys were conducted under the auspices of a steering group that represented KLM (the national airline), the airport authority, and the civil aviation authority.

These surveys were conducted over the long term; five surveys were conducted every 2 years. Each survey covered a period of 1 week; 20 percent of all departing passengers were interviewed.

At first, all of the groups concerned were satisfied with the results of the surveys. As time passed, however, and it became possible to compare the Schiphol Airport data with other data sources (e.g., household surveys on vacation trips made by plane), the validity of the results of the Schiphol surveys was viewed with growing skepticism.

Increasing computerization, which allowed a much more detailed analysis of the data, reinforced these doubts. It was decided, therefore, that a thorough examination of the existing survey methods was nec-

essary and that a new survey design would have to be developed, on the basis of the most recent developments in survey techniques.

ANALYSIS OF SURVEY METHODS USED TO STUDY VACATION TRAVEL IN THE NETHERLANDS

The vacation travel behavior of persons living in The Netherlands had been studied and analyzed by a number of different research institutes, some of which have been collecting data on vacation travel for many years. The results of these studies, however, varied considerably--especially for some of the important key data variables. [This is also the case in the Federal Republic of Germany (1).] This created a particular problem because when data on the status quo are not accurate, the forecasts based on such data are quite precarious.

The Dutch Ministry of Transport, which was well aware of the problematic nature of the data being supplied, subsequently decided to initiate an evaluation of the ongoing studies (2). The goal of the evaluation was to

- Critically review the survey methods used,
- Evaluate the survey results,
- Show ways to correct biased data, and
- Summarize the steps (still) necessary to provide data that could be used for forecasting.

Surveys Analyzed

In The Netherlands, there are three important empirical studies on vacation travel behavior:

- Vacation Survey conducted by the Central Bureau of Statistics (CBS).
- Continuous Vacation Survey conducted by The Netherlands Research Institute for Vacation and Tourism (NRIT) and the Institute for Social Psychological Surveys and Market Research (PANEL).
- Airport Survey commissioned by the Ministry of Transport (AIR).

The survey methods used in these studies and the goals of the studies varied greatly and cannot be directly compared. Nevertheless, it was surprising--and unsatisfactory to the users of the data--that the basic data on vacation travel in The Netherlands varied so significantly.

The CBS study is the classic study on vacation travel behavior in The Netherlands. In this survey, 4,000 (net) inhabitants of The Netherlands are personally interviewed each year. For 13 years, the contents of this survey have remained basically unchanged. The survey deals exclusively with vacation trips of at least 4 nights' duration.

The PANEL study, which has been in operation since 1980, deals with past vacation trips of at least 4 nights' duration, short vacation trips of 1 to 3 nights, and planned (short) vacation trips. Furthermore, four times during the year (once during each quarter), PANEL does postal surveys that include about 5,000 inhabitants of The Netherlands. The nonrespondents are replaced once a year by some of the (approximately) 15,000 persons included in the entire panel. The persons who are interviewed in the vacation PANEL are also interviewed up to eight times a year on other topics.

The AIR survey of airport passengers deals with all passengers embarking in Holland--most of them at Schiphol Airport. This survey is conducted two or three times a year for periods of one week at a time. Every fifth passenger is personally inter-

viewed in the waiting area after check-in. In 1981 about 75,000 people were interviewed in this way. Although this survey does not represent vacation travel behavior overall, the results are very important for air travel. In this respect it differs from the CBS and PANEL studies.

Differences in the Data Collected by the Various Surveys on Vacation Flights

The comparison of the surveys that follows deals only with those vacation trips made by plane. This is done not only because all three surveys dealt with this type of trip, but also because the impact of the use of different survey methods can be observed particularly clearly for these trips.

A comparison of the results of the three surveys makes it clear that the data vary radically (as can be observed from the following table). If AIR is used as the basis for the number of vacation trips made by plane, the PANEL survey registers only 60 percent of the actual number of trips, and the CBS survey registers only 75 percent. In other words, for every five vacation flights, PANEL had two too few, or AIR had two too many flights. A comparison of the results of the three surveys, based on figures for 1981, is as follows:

	<u>CBS</u>	<u>PANEL</u>	<u>AIR</u>
Vacation flights (in millions)	1.08	0.86	1.44

PROBABLE REASONS FOR DIFFERENCES IN THE RESULTS

It is impossible to explain the considerable differences in the results satisfactorily. Nevertheless, as a result of the experiments that have been performed recently using different survey methods (3), it is possible to estimate the type and extent of errors that cause inaccurate survey results (4). The CBS and PANEL surveys are discussed briefly next, and the AIR survey is discussed in more detail later.

The CBS and PANEL surveys underestimate the number of vacation trips made by plane. In the CBS surveys, the main reasons for this underestimation are as follows:

- The data are not weighted--either sociodemographically (by age and sex, for example) or spatially (e.g., relative to community size);
- Because the effect of nonresponse is not estimated, it is likely that the number of trips reported is too low. People who travel frequently are, naturally, seldom at home, and it is more difficult for the interviewer to contact these people (5).
- It is natural for some people to forget some of the trips they made in the past 12 months (6). This should be taken into account when a survey is conducted.

In the PANEL surveys, most of the inaccuracies in the data were caused by nonresponse and by problems arising from the nature of the panel itself. Because the PANEL survey used both sociodemographic and spatial weighting, and because the reporting period was only 3 months, it is much less likely that the respondents forgot trips that had taken place. Current research on survey methods, however, shows that whenever a panel is used, the panel itself has a specific impact on the survey results (7), although it is almost impossible to estimate satisfactorily the direction and extent of this impact.

In the AIR study, three factors of varying importance caused the number of vacation flights to be somewhat overrepresented. The first, which is the least important and easiest to control, is the fact that the AIR studies include all persons living in The Netherlands, including foreigners. The other surveys only include citizens of The Netherlands; therefore the AIR survey naturally has more trips.

The second important factor is the sampling procedure. In the following section an explanation is given about how this causes the number of vacation trips to be overestimated.

The third factor relates to the qualitative improvement of the results. In the section titled Survey Design Used, the advantages of using self-administered questionnaires rather than personal interviews are discussed.

Sample Design of the AIR Survey

It is possible to determine the actual number of airline passengers because this figure is available from the airline ticket statistics. Figures on passengers become problematical only when subgroups (such as vacation travelers) are being reviewed because the statistics do not differentiate between travel for different purposes. If data on specific groups of passengers are needed, therefore, it is necessary to conduct surveys of the airline passengers.

The overrepresentation of air trips appears to be caused by nonresponse, and the nonresponse problem is a result of the sample design. To make this clear, it is necessary to describe more precisely how the airport passenger surveys are conducted.

In the AIR survey, every fifth flight passenger is interviewed. This quota is always the same, irrespective of the type of flight, that is, whether it is a vacation charter or a scheduled flight, an intercontinental or a European flight, a flight with 30 passengers or 300. This quota system causes a number of problems, not all of which can be solved--meaning that the resulting data are somewhat biased.

Three examples help to demonstrate some of the problems arising from the quota system:

- * For charter flights to vacation destinations, all passengers have to be at the airport early. It is easy, therefore, to select a representative sample, and the results of the survey are likely to be correct.

- * For regularly scheduled flights with frequent connections--for example, Amsterdam to London--passengers more frequently appear at the gate shortly before departure. This means that when a survey is being conducted, a relatively high number of passengers have to be interviewed in a very short time. It is generally hectic at this time, with both passengers and personnel becoming somewhat anxious in the last minutes before boarding, and it is difficult to organize a survey in which enough interviewers are available during this time. Consequently, it is difficult to interview a representative sample, and the final sample is also unlikely to be representative. An attempt is often made to counteract this problem by sampling an overproportional number of passengers who arrive early, meaning that those passengers who arrive (very) late are generally underrepresented.

- * The foregoing problem is aggravated for flights with many passengers, for example, on jumbo jets from Amsterdam to New York. Thus, for these flights, it is even more difficult to obtain a representative sample.

These three examples show that passengers on

charter flights tend to be fairly accurately sampled, and the last minute passengers (LMP) (those persons who arrive at the gate just before departure) tend to be underrepresented, whereas those passengers who arrive early for their flights tend to be overrepresented. The LMPs are usually the passengers who fly most frequently, and a large proportion of these persons are business travelers, whereas many of the other passengers are traveling for personal reasons. Thus, it is obvious that the vacation travelers are overrepresented in the trip purpose structure of that AIR survey.

Survey Design Used

As in many other airports, personal interviews are used in the Schiphol Airport surveys. The interviewers are responsible for selecting the sample and conducting the interviews (approximately 3 min each). After close observation of this interview situation, it is doubtful that this approach can produce valid results.

When the interviewers arrive at the gate to begin their interviews, the passengers quickly register what is about to take place. Because only every fifth passenger is interviewed, the interviewer is forced to select those persons to be interviewed. Persons who would gladly be interviewed (because they are bored or curious) are frequently not interviewed, whereas persons who resent being interviewed are asked to answer questions. This means that the general atmosphere in which the interviews are conducted is somewhat tense.

Furthermore, it is natural that the interviewers select those passengers whom they believe will be relatively easy to interview. This also causes the sample to be slanted toward the leisurely vacation traveler, who appears more pleasant to interview, and away from the hurried business travelers who are occupied with their papers.

Finally, in airport interviews, as in any interviews, the interviewer might (unintentionally) influence the interviewee's responses. Because the interview is relatively short and very standardized, however, this impact is likely to be minimal.

TESTING A NEW DESIGN

As discussed previously, the surveys that were conducted at Schiphol Airport were not totally satisfactory. The individuals responsible for commissioning these surveys wanted to determine whether the methods used to conduct the surveys at the airport could be improved. The major problem was, naturally, the sample design--especially the LMP problem and the survey method that should be used.

In the following sections, the experiences reported can be applied to other airports, as well as to Schiphol Airport. Those problems that were specific to Schiphol Airport, and that were sometimes difficult to solve, will be discussed elsewhere.

GENERAL EXPERIENCE GAINED FROM THE AIRPORT SURVEY TEST

Self-Administered Survey

The tests that used the self-administered survey technique proved that this method was accepted positively by most passengers. The majority of passengers (many of whom had nothing to do anyway) were willing to carefully fill out the questionnaires in the relaxed atmosphere of the airline terminal.

Certain prerequisites are necessary, however, to ensure the success of this method:

- The interviewers should briefly contact the passengers in a friendly and motivating manner.
- Writing materials, as well as a writing board, should be supplied.
- The questionnaires should be appealing, not too long, and easy to understand.
- The questionnaires for normal and transfer passengers should be identical; the appropriate filter questions should be used.
- The questionnaires should be in the mother tongue of the respondent.
- One contact persons should be present to answer any possible questions and to collect the questionnaire.

The tests showed that one major advantage of using written questionnaires instead of personal interviews was that, within the same period of time, fewer personnel could handle a much larger number of respondents. Furthermore, as has already been repeatedly demonstrated (8), when the respondents fill out the questionnaires, the results are more valid. This is primarily because the respondents have more time to consider their answers, all the respondents have an identical questionnaire, and the interviewer cannot introduce bias into the responses. Moreover, the respondent is not put under direct psychological pressure by the interviewer; therefore, the entire process is more harmonious--a fact that is evident even to external observers.

Sample Design

When the survey is conducted in written form, one important technical problem is already solved. The tests showed that the same number of personnel can handle many more respondents. Also, the quota system was not necessary because all passengers could be included in the survey. The only remaining problem was the problem of the LMPs. It was necessary to treat these passengers specially.

The LMP survey had to be conducted by using personal interview techniques, and the number of questions asked had to be reduced to a minimum. The interviewers used the normal written questionnaire forms, but asked the passengers to answer only the first four or five questions. If there was enough time, the interviewer asked as many of the questions used in the normal questionnaire as was possible. However, this was not to be done if it meant that other LMPs arriving at the gate would be overlooked.

As departure time approaches, it becomes increasingly difficult to interview the LMPs because these last passengers, as well as airline personnel, tend to become anxious. During the test it became evident that this problem could be dealt with if the interviewers approached the passengers as far away from the gate as possible and personally interviewed the passengers on their way to the gate. The airline's ground personnel also had no objections to these interviews because they caused no delays.

Importance of the Interview Team

Finally, the importance of the interview team used for such surveys must be stressed. A special type of interviewer is needed to deal with the relatively sensitive target group at the airport.

It proved useful to divide into teams with one supervisor for every one to five interviewers. The supervisor was in charge of organizing the survey

with the main task of leading the team and giving interviewers instructions when necessary. The supervisor is especially important at the point when the written questionnaires are no longer used and the LMPs have to be personally interviewed. It is important that the team (i.e., the supervisor and the interviewers) be able to work together smoothly and that all persons on the team know what is expected of them.

The interviewer is especially important when written questionnaires are used instead of personal interviews. It is more difficult to interact with a large number of passengers for a short period of time than to spend more time personally interviewing only a few passengers. Even if the interviewers are under the direction of the supervisor, it is important that they be able to think independently; supervisor and interviewers need to form a smoothly functioning team.

CONCLUSION

An analysis of surveys on vacation travel behavior in The Netherlands has shown that the basic data from different surveys varies considerably. This was also the case for vacation trips made by plane. The Ministry of Transport wanted the results of the airport passenger survey to be critically and objectively reviewed.

It was possible to show that the sample design that was being used to determine the number of passengers making vacation trips resulted in an overrepresentation of these trips. The charter and vacation passengers, who usually arrive well in advance of their departure time, are easily interviewed, whereas passengers who arrive late (last minute passengers), and who are frequently either passengers who fly often or business travelers, can only be interviewed with great difficulty. This results in overrepresentation of travelers making vacation or other private trips.

By treating specially last minute passengers (using short personal interviews), it is possible to correctly represent this group. It was also shown that for normal airport surveys the use of self-administered questionnaires is preferable to personal interviews for a number of reasons. Written questionnaires are more economical, more pleasant for the respondents, and the results are more valid.

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Helicopters and Urban Communities

DAVID S. LAWRENCE

ABSTRACT

The principal beneficiary of helicopter services is the urban community, and the growing presence of helicopters in metropolitan areas, now a factor in the management of urban land and airspace resources, has elicited controversy. The benefits and the social costs of helicopter operations in urban communities are addressed, and the steps taken to enhance the benefits and minimize the costs are identified. Three issues are examined: (a) heliports are far less obtrusive in the urban environment than has been believed; (b) the helicopter's benefit to communities is principally transmitted through businesses; and (c) the issue of land use, particularly the allocation of land resources to heliports, is widely misunderstood. Specifically addressed are the two familiar costs of community helicopter operations, noise and anxiety; and a third, less obvious social cost, that of foregone opportunity. Steps taken by members of the helicopter community to enhance benefits and minimize costs are described. These steps involve both technology and communications. In the longer run, however, these improvements go beyond the amelioration of social costs--they reflect understanding between helicopter operators and the communities they serve, and they reflect a convergence of their objectives.

Although helicopters have been produced and sold since 1939, the modern-technology civil helicopter, as such, is largely the result of technology transfer from the Vietnam War period. The acceleration of civil helicopter technology since 1970 is analogous to that of fixed-wing technology after World War II--marked by quantum improvements in performance, reliability, and cost, which combine to clothe rugged military aircraft in the amenities and economics of commercial aviation.

This evolution has been accompanied by a dawning realization that the principal beneficiary of helicopter services is the urban community. Helicopters have provided unique, essential, and often dramatic services in rescue, air taxi, medical evacuation, police work, high-rise construction, and even the rapid clearing of financial paper. All of these

services contribute meaningfully to the preservation and even the enhancement of the increasingly compromised amenities of urban life. This unique service value to the community is perceived by urban political and business leaders, whose demand for helicopter services has drawn helicopters to metropolitan areas in growing numbers.

In the past 20 years, the number of helicopters in major metropolitan areas has grown at an annual rate of about 15 percent--twice the rate for the country as a whole. The presence of helicopters has now become a factor in the management of urban land and air-space resources, and like other resource users, helicopters and their necessary heliports have elicited controversy. Most community leadership, mindful of overriding benefits, considers helicopters a necessity--not unlike factories and freeways--whose