

## **Data collection on tourism flows – from fragmentation to harmonization?**

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**Petter Dybedal**

*Chief Research Officer*

*Institute of Transport Economics*

*pd@toi.no*

### **ABSTRACT**

Data on long distance travels and regional visitor figures in Norway is dependent on different sources collecting data from different purposes and in different contexts. Periodical data collections besides Statistics Norway's domestic travel household survey are mainly performed by the Institute of Transport Economics (TØI). The different surveys, including The National Travel Survey, the national Air Travel Survey and the Foreign Visitor Survey are not sufficiently harmonized as regards variables, variable specification, sampling procedures, etc, and results are not directly comparable. A particular problem is regionalization of data, which is hampered by small sample sizes in both the Domestic Tourism Survey and the Foreign Visitor Survey.

This paper discusses various aspects of visitor statistics in Norway and possible synergy effects between the various surveys, as seen from TØI. The advantages of being a major producer and user of travel statistics in a variety of research contexts and programs are evident, however, mostly related to scientific competence synergies. Improvements to secure reliable visitor data on regional levels have primarily to come from increases in sample sizes and harmonization of trip characteristic variables in the different surveys. To which researchers definitely can contribute, however with competence, not with financial resources.

## INTRODUCTION

The phenomenon of long distance travel calls for research interest in many contexts. Some of these are directly related to tourism issues, and some are more or less indirectly related. Knowledge of long distance travels is essential also to researchers involved in for instance transport sector analysis and planning (air, bus, rail, ferries, etc), spatial analysis and planning, public investment decision making (roads, rail, airports etc) and environmental research concerning for instance sustainable mobility. Hence, tourism researchers, public authorities and other stakeholders request data on long distance travels for a variety of reasons. More specifically, also studies and measurements of tourism flows are motivated from various types of purposes, for instance analysis of economic impacts of tourism, destination and/or tourist attraction development and various aspects of tourism planning, including sustainable tourism issues.

The variety of incitements to collect information on tourism flows implies that data on tourism flows may be available from a multitude of sources. On one hand, synergy effects may be derived, as there may be mutual links even if the initial approaches and motives are different. On the other hand, different approaches as regards data collection design, tourism definitions (Peeters, Szimba and Duijnsveld 2007, Lickorish 1997), sample size and variables included, may imply a state of fragmentation. I. e., the quality and reliability of results derived from different available data sets may be limited due to lack of comparability or simply lack of specific data.

The broad transport related research profile of the Institute of Transport Economics (TØI) implies that long distance travel is subject to research in several different contexts. Besides Statistics Norway, TØI is the only research institution in Norway conducting national level data collection on long distance travels and other tourism flow related statistics.

Hence, possible benefits and problems of combining long distance travel data collected from different perspectives, in order to – for instance – map visitor flows, are quite familiar issues at TØI.

On this background, this paper discusses methodology and data collection issues, particularly as regards regional breakdown. Knowledge on regional visitor flows in the context of estimating regional tourism economic impacts, implying (in our case) emphasize on characteristics of tourism trips is focused. The paper also discusses possible synergies in view of possible mutual links between the different research programs at TØI and the different data collection regimes administrated within these programs.

## TOURISM FLOWS AND AVAILABLE STATISTICS IN NORWAY

Focusing measurement of domestic and inbound tourism flows and economic impacts, a common statistical issue is to map trips by origin and destination patterns, type of tourism product, main purpose of trip, duration/length of stay, type of accommodation and mode of transport (UNWTO 2008). The following presentation and discussion of statistics is carried out with respect to these types of variables.

**Table 1 The system of periodical tourism related statistics in Norway**

<b>Institution</b>	Statistics Norway		Institute of Transport Economics		
<b>Name/type of statistics</b>	Accommodation statistics	National Tourism Survey	National Travel Survey	National Air Travel Survey	Norwegian Foreign Visitor Survey
<b>Type of collection</b>	Electronic guest night reports from industry	Household survey (CATI)	Household survey (CATI)	On site (airport gates) survey	On site (border crossings) survey
<b>Annual</b>	All enterprises	4 800 – 5 200	10 000 (main	42 000 (domestic)	12 000

<b>sample size</b>	above certain size		sample)	71 000 (international)	
<b>Responsible authority / principal</b>	Statistics Norway CD 95/57/EC	Statistics Norway CD 95/57/EC	Ministry of Transport and communications	AVINOR (Norwegian state airport operator)	Innovation Norway/Ministry of trade and industry
<b>Main purpose</b>	Measure level & development in guest nights at Norwegian accommodation establishments	Monitor Norwegians' travel habits in Norway and abroad	Map everyday travel and mobility among Norwegian residents Map characteristics of long trips (> 80 kms)	Monitor various characteristics of demand in domestic and international air transport to and from Norwegian airports	Monitor volumes and structures in inbound tourism Map tourists' experiences and perception
<b>Frequency</b>	Monthly	Quarterly	Every fourth year	Every second year	Annually
<b>Tourism category</b>	Domestic and inbound	Domestic and outbound	Domestic and outbound	Domestic, outbound and inbound	Inbound

Currently such data may be deduced from five main sources, comprising accommodation data, household surveys and on site surveys (table 1).

Statistic Norway's accommodation statistics is an important source as it supplies total guest night figures by nationality and purpose of trip (leisure, business and conferences) by regions within NUTS III level for different types of commercial enterprises. As accommodation statistics do not include huge non-commercial accommodation sectors like VFR (Seaton and Palmer 1997) and second homes, and (by nature) do not comprise origin/destination issues, however, sample surveys focusing long distance trips are necessary means to provide complete data on visitor flows.

## MEASUREMENT OF DOMESTIC VISITOR FLOWS

Data on domestic visitor flows are collected in three different types of surveys (table 1 and table 2). The only public survey is Statistics Norway's national quarterly travel household survey (hereby denoted the Domestic Tourism Survey), which is performed according to the Council Directive 95/57/EC (Statistics Norway 2006). Respondents aged from 16 to 79 are asked about trips with overnight stays the last three months (CATI interviews). The travel survey is included in a national survey comprising several subjects.

Statistics Norway's survey would have been a natural basic source for domestic visitor flows data, as it contains most of the trip characteristics required for if it was not hampered by a small sample size (5 000 completed interviews per year), that make regional breakdown not recommendable on NUTS III level. Even NUTS II level is critical (no regional breakdown is published by Statistics Norway), particularly when it comes to combining destination with trip characteristics like type of accommodation or mode of transport. Correspondingly, origin/destination patterns on NUTS III level (19 counties in Norway) is possible to derive from the data, but is not recommended. Furthermore, day visitor trips are not included. The purpose of trip variable is not sufficiently detailed, however, as important segments like VFR and second home trips may be identified as they are specified as categories of the type of accommodation variable. As regards types of tourism products, this survey does not record any characteristics except accommodation type and mode of transport.

The National Travel Survey (RVU) is a household survey (CATI) designed and conducted by TØI every 4<sup>th</sup> year for the Ministry of Transport. The main focus is to map everyday travels by recording daily trips by purpose, O/D and mode of transport among people aged 13 years and older. A long distance trip module, comprising trips longer than 80 kilometers undertaken during the last month, is included (Denstadli 2006), likewise a questionnaire module on trips to

second homes. The survey comprises a national sample of approximately 10 000 interviews over a one-year period.

**Table 2 Comparison of data sources and available periodical data on domestic tourist trips in Norway**

<b>Institution</b>	Statistics Norway	Institute of Transport Economics	
<b>Name/type of statistics</b>	Domestic Tourism Survey Sample: 4 800 – 5 200	National Travel Survey: Long distance module Sample: 10 – 12 000	National Air Travel Survey Sample: 35 000
<b>Recall period</b>	3 months	1 month	Duration of trip
<b>Purpose of trip</b>	Holiday, other leisure, business	18 categories	10 categories
<b>Type of accommodation</b>	18 categories	Not included	Not included
<b>Main mode of transport</b>	10 categories	16 categories	Air only
<b>Destination breakdown</b>	4 regions (NUTS II)	County level (NUTS III)	County level (NUTS III)
<b>Recommended Origin/destination breakdown</b>	4 regions (NUTS II)	4 districts (NUTS II)	County level (NUTS III)
<b>Duration measure</b>	Number of nights (> 0)	Number of nights (incl 0)	Number of nights (incl. 0)
<b>Day visitors</b>	No	Yes	Yes
<b>Tourist definition</b>	All travelers, tourists may be selected	All travelers, tourists may be selected	All travelers, difficult to identify non-tourists
<b>Stratification variables</b>	Age, sex, county of residence (“representative national sample”)	County level, by population number	Relations, month, weekday, departure time
<b>Inflation to total numbers variable</b>	Population age groups (4)	County population aged 13 or more	Total passenger numbers on each relation
<b>Data collection period</b>	Whole year (each quarter)	Whole year	Whole year

Although performed every fourth year only, the National Travel Survey represents a valuable support, as it also includes same day trips. Designed to meet needs at the Ministry of Transport (which is not the body responsible for tourism), it does not include type of accommodation or other variables that could enlighten the demand for different tourism products.

The sample is twice as large in number of interviews; however, not in terms of number of trips, as the recall period is one month compared to three months in Statistics Norway’s survey. The shorter recall time indicate that data should be more reliable than those in Statistics Norway’s survey.

The National Air Travel Survey is conducted by TØI in cooperation with AVINOR (a state owned limited company operating the Norwegian airport network) every 2nd year (Denstadli, Gripsrud and Rideng 2008). Questionnaire hand-out and collection are both performed at departure gates. The overall idea is to monitor passenger traffic (domestic and international) at Norwegian airports for the purpose of planning and developing the airport network. Characteristics of trip include O/D patterns of total trip, purpose, length of stay and mode of transport to and from departure airport. The 2007 survey comprised 42 000 interviews on domestic flights, of which 35 000 were Norwegian residents on domestic trips (both trip origin and trip destination within Norway).

The National Air Travel Survey supplies a rather detailed picture of domestic tourism trips by air, which implies that trips by air are much better covered than the other transport sectors are. As the survey is designed from the purpose of air transport and airport development, it does not include information on type of accommodation and other tourism product variables.

#### MEASUREMENT OF INBOUND TOURISM FLOWS

As seen from table 1, data on inbound visitor flows may be derived from three different sources, the Statistics Norway accommodation statistics, the National Border Survey and the national Air Travel Survey.

The national border survey is performed annually for Innovation Norway (responsible for marketing tourism in Norway), and is the international equivalent to Statistics Norway’s domestic travel survey (Rideng, Haukeland and Heimtun 2007, Rideng and Grue 2008). The main purpose is to monitor inbound tourism. Visitors are characterised

by a number of variables, including nationality, length of stay, type of accommodation, mode of transport etc. Interviews (questionnaire hand-outs and collection) are made on departure from Norway, at airports, ferry/bus/train terminals and border crossings (road). Total sample size is appr. 12 000 per year, of which 4 300 at ferry terminals (mainly motor vehicle travelers), 4 500 at airports, 1 600 car passengers at road border crossings and 1 600 at bus and train terminals. The Foreign visitor Survey is the only periodical survey that records variables concerning various aspects of the tourism product.

**Table 3 Comparison of data sources and available periodical data on inbound visitor flows to Norway**

<b>Institution</b>	Institute of Transport Economics	
<b>Name/type of statistics</b>	National Border Survey: Sample: 12 000	National Air Travel Survey Sample: 24 000
<b>Recall period</b>	Duration of trip	Duration of trip
<b>Purpose of trip</b>	8 categories	10 categories
<b>Type of accommodation</b>	9 categories	Not included
<b>Main mode of transport</b>	Motor vehicle, bus, train, ferry, air	Air only
<b>Destination breakdown</b>	4 regions (NUTS II)	County level (NUTS III)
<b>Rec. origin/destination breakdown</b>	Country level (NUTS I)	Country of residence (NUTS I) by county in Norway (NUTS III)
<b>Duration measure</b>	Number of nights	Number of nights
<b>Day visitors</b>	Yes	Yes
<b>Tourist definition</b>	All travelers, tourists may be selected	All travelers, difficult to identify non-tourists
<b>Stratification variables</b>	Relation/mode of transport, month, weekday	Relations, month, weekday, departure time
<b>Inflation to total numbers variable</b>	Ferry, air, train, bus: Total number of passengers on each relation by country Road: Total traffic by border crossing	Total passenger numbers on each relation
<b>Data collection period</b>	Whole year	Whole year

Data collection at border crossings along Norway's long border against Sweden, Finland and Russia is obviously the weak point of the survey. Hand-outs and collection of questionnaires require assistance from uniformed authorities (police, road authorities or customs), which is expensive and difficult to organize in order to obtain satisfactory numbers of respondents. Hence, the number of respondents is low. Another problem is to estimate total road traffic, which is done by collecting traffic data (total number of vehicles passed) from the road authorities and counting number plates (distribution by nationality) on selected dates. Figures for total traffic by country of residence are supplied by ferry companies and airports (supported by national air travel survey data), while bus and rail figures are inflated by total number of passengers.

Corresponding to the domestic survey, also the foreign visitor survey is hampered by insufficient sample size. This particularly affects regionalization of data to county level (NUTS III). Establishing O/D patterns within Norway (place of entry – destination in Norway) is difficult also due to large proportion of multi-destination trips, particularly in the summer season.

The national border survey has one particular advantage compare to the other surveys discussed in this paper. The questionnaires have a comprehensive tourism product module, including questions regarding activities and experiences, interests, perception of the Norwegian tourism products, etc.

The international part of the national air travel survey comprised 24 000 completed questionnaires in the last survey (2007). The survey is basically identical to the domestic survey, as regards both types of data collected and collection procedures. Origin/destination patterns may be produced for trip starting point (country/airport) by place visited in Norway.

## **SYNTHESIS: REGIONAL BREAKDOWN IS A MAJOR PROBLEM**

As pointed out previously in this paper, regional visitor figures and trip characteristics may be essential for for instance estimation of regional economic impacts. Such estimations may be carried out by a variety of different methods or combination of such (Frechtling), however, regional visitor data (guest nights and number of day visitors) normally constitutes a basic part (Dybedal 2007, 2006, 2005). The presentation in this paper clearly reveals that available data material is fragile with respect to reliable regional breakdown of visitor data. This is mainly due to too small sample sizes in the basic surveys (the national tourism survey and the national border survey). Besides, the supporting surveys partly fail to describe the visitor flows sufficiently, because they omit essential variables like type of accommodation.

In principle, regional visitor numbers by type of accommodation can be estimated from (I) accommodation statistics in commercial sectors and (II) relative distribution of visitors from sample surveys on the same commercial sectors and important non-commercial sectors like VFR and second homes. However, this is hampered by a high degree of statistical uncertainty in the surveys, not being able to produce reliable distribution of guest nights on regional levels. Another matter (which shall not be further discussed here), is the lack of reliability in current accommodation statistics for small enterprises, holiday dwellings and let-out of privately owned accommodation units. Some examples from an ongoing regional impacts research project at TØI illustrate the problems of mapping regional visitor flows:

- Estimation of second home guest nights from actual number of second homes in each county and a recent national survey performed by TØI on use of second homes<sup>1</sup> give figures that are quite different from those derived from the Domestic Tourism survey, on both national and county levels.
- The distribution of guest nights on different commercial sectors (hotels, camping, holiday dwellings, rented second home) derived from the national border survey does far from match the corresponding distribution derived from Statistics Norway's accommodation figures for foreign visitors. The reason is partly because accommodation is specified differently (demand side based) in the border survey than in the accommodation statistics (supply side classification), but also because the border survey embraces commercial accommodation not covered in the official statistics.

I.e., comprehensive additional data collection, including both the commercial accommodation sector, the second home sector, has proved to be necessary for establishing reliable visitor figures on county level in Norway. This undermines an otherwise fruitful top-down approach, which more or less has to be replaced by a bottom-up approach.

## **LONG DISTANCE TRAVEL RESEARCH AT THE INSTITUTE OF TRANSPORT ECONOMICS**

In the last section of this paper we will give an overview of how long distance travel research is organized at the Institute of Transport economics (TØI), and discuss whether the different approaches lead to synergies as regards data collection and understanding of the phenomenon of long distance travel.

TØI is a national institution for transport research and development, originally established in 1964 as a separate research institution under the auspices of the Royal Norwegian Council for Scientific and Industrial Research (NTNF, now merged into the Research Council of Norway). In

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<sup>1</sup> 3 000 completed web-based interviews with second home owners, covering the year 2008

1986 the Institute became a private, independent research foundation. The Institute receives an annual base funding from the Research Council of Norway, and is otherwise financed from research projects within national and international research programs and from applied research projects for national and regional authorities, private industries and other stakeholders. The main objectives of the Institute are to carry out applied research on issues connected with transport and to promote the application of research results by advising the authorities, the transport industry and the public at large. TØI's sphere of activity includes most of the current major issues in road, rail, sea and air transport, hereunder responsibility for national transport surveys.

Long distance travel research and data collection is organized within different institute research programs, from different perspectives: The Tourism Research Program unit conducts the annual data collection and analysis of inbound tourism (the Foreign Visitor Survey). It was initiated by TØI in 1994, and is now financed by Innovation Norway (the national tourism marketing organization), which is a body under the Ministry of Trade and Industry. Within a comprehensive research program on regional economic impacts of tourism, the Tourism Research unit has also recently carried out household surveys on domestic tourism expenditures and trip characteristics.

The Travel Behavior and Mobility Program conducts planning and analysis of the National Travel Survey for the Ministry of Transport and its executive bodies within rail, road, coastal transport and air transport. The unit also conducts the National/International Air Travel Survey in cooperation with the Norwegian airport authorities (AVINOR). Two other programs, Regional Analysis and Sustainable Mobility, cover research topics that imply travel analysis and research interests in the surveys mentioned.

These four programs, or units, are organized within the same department, and a flexible organisation secures that researchers may switch between the different units. There are clearly mutual links between the different programs as regards understanding of long distance travel and survey methodologies, and clearly an advantage that a wide range of travel related research is performed within the same institution.

The benefits arising from easy access to data files and first hand insight in survey design and data collection procedures, as well as in data quality and applicability, should not be underrated. Obviously, this increases data exploitation and secure careful application of available data.

However, we must face that these mutual links have not yet led to harmonization of the different surveys sufficiently, nor increases in sample sizes, to exploit possible synergies as regards visitor flows. The reasons for this are to a large extent linked to the fact that the data collection on for instance trip characteristics is performed in initially different contexts, for instance geographically. An increase in comparability, for instance implementing a common trip characteristics module, or an increase in sample size to improve regional breakdown options, faces the following obstacles:

- Most surveys are quite comprehensive<sup>2</sup>, comprising several other variables and research approaches, influencing both the number of variables in the questionnaire and the specification of variables
- Limited budgets prohibits extension of sample size
- The authorities responsible for financing the different surveys are quite influential on specification of variables, which favours sub-optimalization of survey approaches.

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<sup>2</sup> The National Travel Survey interview time is for instance 25 minutes

As regards the National Tourism Survey, it is entirely the responsibility of Statistics Norway and is performed within a large survey (“omnibus”). Hence, the sample size is determined outside the particular needs of tourism researchers, however, said to be meeting the requirements of EC statistics directive.

Some bright spots may be observed: Innovation Norway (National Border Survey) and AVINOR (National/international Air Travel Survey) are currently negotiating coordination of data collection, which also implies a harmonization of variables. This will increase the sample size considerably for the air transport section of inbound tourism as regards visitor flow characteristics, and still be comparable to data on road and ferry travelers.

## **CONCLUDING REMARKS**

Measurement of tourist flows on regional levels in Norway is negatively influenced by a fragmented supply of relevant data. Information must be derived from combination of different household surveys, field surveys and accommodation statistics.

A fruitful synthesis of data from these surveys is restricted by different specification of variables and small sample size. One obvious explanation, and experience, is that long distance travel surveys are established for different purposes and performed in different contexts, requiring different approaches and implying different variables and variable specifications, different foundation for inflating sample data to total figures, etc. Some harmonization may be undertaken by researchers involved, although budgets and size of questionnaire may restrict noble intentions of general applicability and comparability.

It seems that rather the different Ministries (and other stakeholders) financing the surveys may be the key actors for improvements.

Particularly, an agreement on implementation of a visitor flow module common to all the surveys as regards trip characteristics would represent a big improvement. I.e., to include the type of accommodation variable in all surveys, and to apply the same variable specification for other trip characteristics variables like purpose of trip and mode of transport. This would make results much more comparable. It would, however, not affect the other major problem, the sample size, as data from different surveys would not be possible to integrate in the same data file. Both basic visitor flow surveys in Norway, Statistics Norway’s Domestic Tourism Survey and TØIs Foreign Visitor Survey, are hampered by small sample sizes. This implies that additional regional data collection has to be undertaken to establish reliable regional figures on NUTS III levels (county) – which are frequently demanded by county authorities. In fact, on regional levels, visitor figures are subject to a bottom-up approach rather than the top-down approach reliable macro data could have represented.

Improvements as regards domestic tourist flows seem to rely on significant upgrade of the national travel survey conducted by Statistics Norway. Above all, sample size has to be extended considerably from today’s 5 000 to establish reliable O/D matrixes on NUTS 2 level and visitor data on NUTS III level. A large enough sample will eliminate today’s dependency on the long travel data from the National Travel Survey, which is performed every fourth year only. A possible solution is that Statistics Norway and the Ministry of Transport (National Travel Survey) negotiate over a harmonization of the Domestic Tourism Survey and the long distance travel module of the National Travel Survey as well as and a cooperation aiming at a considerable sample increase.

Likewise, a regionalization of inbound tourism requires a larger sample on road and ferry border crossings.

The advantages of performing a wide range of travel related research and data collection within the same institution (TØI) is above all related to scientific competence synergies. A first hand insight in survey design and data collection procedures combined with easy access to data files secure a competent and careful application of data, based on a thorough knowledge of analysis possibilities and obstacles. Hereby, all inferiorities are also evident for the researcher, an issue that should not be underrated!

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