Tourism Acceptance of the Austrian population

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Abstract

The measurement of the tourism acceptance by Statistics Austria represents a significant step forward in recording the social dimension of tourism in Austria. Building on the amendment of the Tourism Demand and Acceptance Statistics Ordinance 2024, the new survey aims to capture the perceptions and attitudes of the Austrian resident population towards tourism. The data on the perceived impact and importance, the perceived volume and the financial dependence of people on tourism closes a key gap in existing tourism statistics, which have so far primarily considered economic indicators.

The paper and presentation focus on methodological principles such as the survey procedure, sampling and the design of the questionnaire, which were optimised in advance by means of a comprehensive pre-test. The survey is carried out as a supplementary survey to the travel behaviour survey conducted on the basis of Regulation (EU) No. 692/2011 of the European Parliament and of the Council and is based on a proportionally stratified random sample of the Austrian resident population aged 15 and over. Around 3 000 computer-assisted web interviews are carried out each quarter, resulting in an annual net sample of 12 000 people. The results are weighted, extrapolated and converted into descriptive statistics and the tourism acceptance score. In addition, innovative approaches such as a small area estimation model are used, which enables detailed estimates to be made at municipal level.

The results of this survey not only provide transparent insights into the social impact of tourism, but also form the basis for evidence-based measures and strategies for sustainable tourism development. Austria is thus setting an international example for the integration of social sustainability aspects into tourism statistics.

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1 Introduction

1.1 Problem definition

For years, tourism in Austria has been described and measured on the basis of tourism flows in the country and the monetary contribution of tourism to the Austrian economy as well as the jobs created by tourism. Based on Regulation (EU) No. 692/2011 of the European Parliament and of the Council, the tourism flows from abroad and within Austria are depicted on the one hand by the **accommodation statistics** and on the other hand by the sample survey on the **travel behaviour** of the Austrian population. The accommodation statistics include the monthly arrivals and overnight stays of domestic and foreign guests in the annually surveyed commercial and private accommodation establishments in Austria, while travel behaviour records the day trips and overnight stays of Austrian residents in Austria and abroad on a quarterly basis. These statistics are included in the total accounts of the **Tourism Satellite Accounts** (TSA), which calculate the value added generated by tourism as well as the number of people employed in tourism. Tourism-specific economic indicators such as tourism intensity (overnight stays per inhabitant), the contribution of tourism to GDP, the share of tourism in total employment and the travel intensity of the population can be derived from these existing statistics (BMAW, 2024).

However, describing tourism using these indicators alone is not sufficient to obtain a **holistic picture of the phenomenon of tourism**. This is because the demand- and supply-side effects that arise from tourism and that are depicted in the official statistics using the existing indicators are perceived by the population (Schmücker & Eisenstein, 2021). Both nationally and internationally, there is an awareness that both these perceived effects and the attitude of the resident population towards tourism as a result should be measured, as well as other previously neglected aspects of sustainability (BMAW, 2019).

Therefore, at international level under the leadership of UN Tourism the "**Statistical Framework for Measuring the Sustainability of Tourism**" (SF-MST) was developed and is now the third statistical standard for tourism for all UN member states, after the international recommendations for tourism statistics and the Tourism Satellite Accounts. The SF-MST states the following with regard to measuring the perspective of the host community: "... The collection of data on the perceptions and acceptance of host communities would generally be undertaken using surveys of residents..." (p. 122/paragraph 5.51) (World Tourism Organisation, 2024). However, the SF-MST does not provide any further implementation recommendations or any references to required variables or indicators.

At national level, the Austrian "**Plan T - Masterplan for Tourism**" already stated in 2019 that there is currently no suitable indicator for the acceptance and awareness of the population for tourism, neither internationally nor nationally (BMAW, 2019). In line with this, in the 2020-2024 government programme of Austria a further development of the existing tourism indicators, which were created by the responsible ministry and Statistics Austria, with a focus on the ecological and social dimensions of tourism, was planned. With this, growth in tourism will no longer be measured exclusively in terms of overnight stays and the indicators will be expanded to cover the entire value chain and impact on the population, nature, landscape and climate change. If the data basis for such indicators is not available, new or

expanded surveys by Statistics Austria must also be considered and the corresponding financial resources made available (Republic of Austria, 2020).

1.2 Objectives

The topic and filling this data gap have therefore become a focus of work both internationally and nationally in recent years in order to prevent "overtourism" (or "unbalanced tourism" or "undermanaged tourism") and to guide tourist flows (Schmücker & Eisenstein, 2021).

In addition to some regional surveys on tourism acceptance in Germany (e.g. by the NIT) (NIT, 2022), tourism acceptance in Austria was also empirically surveyed from 2020 as part of pilot studies by a market research institute commissioned by the responsible ministry, thus taking the first steps towards the development of an indicator for the social sustainability of tourism (BMAW, 2024). In order to create an ongoing and stable data basis for tourism acceptance in Austria, the Tourism Demand and Acceptance Statistics Ordinance[1],which is also the national legal basis for the survey of the travel behaviour of the Austrian resident population, was amended on 25 March 2024, thus handing over the collection and compilation of tourism acceptance statistics to Statistics Austria. The aim of the **ongoing compilation of tourism acceptance statistics** is to ascertain the perceived effects of tourism on the resident population in order to provide a holistic picture of the population's attitude towards the phenomenon of tourism.

This paper presents the methodological principles of the tourism acceptance statistics from Statistics Austria, such as the survey procedure, the sample and the survey instrument. In addition, the quality assurance steps that were carried out before the initial survey are discussed, followed by an explanation of the process of data cleansing, analysis and any further processing of the data through to the possible results.

[1] Only available in German.

2 Methodology

2.1 General methodological aspects and legal basis

The tourism acceptance of the Austrian resident population is realised as an **additional survey** of the travel behaviour survey conducted on the basis of Regulation (EU) No. 692/2011 of the European Parliament and of the Council. The Travel Behaviour Survey, which represents the demand for tourism, is a quarterly sample survey that records whether and how the Austrian population travels for private and business purposes. While the travel behaviour survey follows a CAWI First (then CATI) survey design, the additional survey on tourism acceptance is solely a Computer Assisted Web Interview (CAWI) survey and always takes place after the travel behaviour survey. The information already obtained from the basic survey on travel behaviour, such as age, municipality/province of residence, gender, highest level of education completed, occupation or travel activity, can be linked to the information on tourism acceptance, thus ensuring that the respondent's burden is reduced and that tourism acceptance can be covered and presented holistically with as few and simple questions as possible.

The Austrian Tourism Demand Statistics Ordinance Federal Law Gazette II No. 25/2012[2] transposed the tasks and requirements to which Austria is subject under Regulation (EU) No. 692/2011 of the European Parliament and of the Council into national law until March 2024 and transferred the compilation of these statistics to Statistics Austria. This regulation was amended on 25 March 2024 in close cooperation between the responsible federal ministry and Statistics Austria and now includes the characteristic of "tourism acceptance" to be collected. The legal basis for the survey of tourism acceptance is therefore the Tourism Demand and Acceptance Statistics Ordinance Federal Law Gazette II No. 86/2024[2] and thus the first legally anchored survey on tourism acceptance.

2.2 Data collection process

The survey on tourism acceptance follows the same survey procedure each quarter as the survey on travel behaviour and is therefore always conducted in the month following the reporting quarter (see Table 1). The gross sample is always drawn approximately one month before the reporting period (see 2.3 Sample), the notification letter is prepared and the questionnaire is programmed. The notification letter is the invitation to participate in the survey on a **one-off and voluntary basis** and contains the different access data for the online survey for each person in the gross sample. The notification letter is always sent by post around the 26th/27th of the last month of the reporting quarter, so that it ideally reaches the respondent on the 1st day of the reporting period at the latest. The reporting period starts with the dispatch of the notification letter and ends on Sunday of the 5th survey week. During the reporting period, the data on tourism acceptance, as it is collected via an online questionnaire, is transmitted by the respondents themselves. All those people in the gross sample who have not yet completed the survey online after around three weeks will receive a postal reminder letter, which again contains the access data for the online survey. During data collection, the information in the questionnaire is

[2] Only available in German.

checked for plausibility and this check is continued by the specialist staff after the survey phase has been completed, before the data is then extrapolated. From the extrapolated data the results and statistics are compiled and published.

Table 1 Overview of reporting quarters, reference period and reporting period

Reporting quarter	Reference period	Reporting period
1st Quarter of the reporting year	January to March of the reporting year	April of the reporting year
2nd Quarter of the reporting year	April to June of the reporting year	July of the reporting year
3rd Quarter of the reporting year	July to September of the reporting year	October of the reporting year
4th Quarter of the reporting year	October to December of the reporting year	January of the subsequent year

2.3 Sample

The sample for tourism acceptance corresponds to the sample selected for the travel behaviour survey and is a **proportionally stratified random sample**. The selection frame for drawing the sample is a so-called in-house "rich frame". This is a sampling frame based on the Central Register of Residents (ZMR), but enriched with additional socio-demographic and regional information from other registers and administrative data.

The **population** is the Austrian population aged 15 and over, whereby the decisive factor is not nationality but permanent residence (= main residence) (as at Q4 2024: 7.73 million people). Persons in institutional households (e.g. persons in retirement homes, but also in monasteries, boarding schools, prisons and psychiatric institutions) are not included in the population. In the specific selection of the people to be interviewed, the principle of minimal respondent burden within the meaning of §7 para. 3 of the Federal Statistics Act 2000 as amended and the aspect of willingness to provide information are taken into account. In order to reduce the burden on respondents, the sample is drawn quarterly and excludes those persons who have already been drawn in the three previous reporting quarters. In addition, since 2022, also to reduce the respondent burden, people over the age of 85 are no longer included in the gross sample, but are included in the weighting of the age category "65 years and older".

For reasons of representativeness (to ensure that elements of the population with certain characteristics are represented in sufficient numbers in the sample), the sample is **stratified proportionally** (1st level: federal province, 2nd level: age, 3rd level: gender), resulting in a total of 108 strata. These strata are formed as follows: The 1st level is the nine Austrian federal provinces. The 2nd level, age, is categorised into six age groups: 15-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65 years and older. For the third level, gender, there are two characteristics, female and male (non-binary genders are treated using the even/odd birthdays method so that they are categorised as male or female). These strata are subsequently necessary when weighting the data (see 3 Data processing).

As the travel behaviour survey is conducted as a **mixed mode** (CAWI First, then CATI) survey, telephone numbers are also required for part of the sample. Based on an electronic interface between the ZMR and the publicly available telephone directory, telephone numbers are determined for the people in the gross sample. As a telephone number is not publicly available for all persons in Austria and the hit rate is

continuously decreasing, approximately 43 000 persons are drawn from the ZMR for the gross sample. From this first gross sample, a telephone number is determined every quarter for an average of 13% or approx. 5 000 people (as of 2024). These people with telephone numbers are then supplemented with people from the gross sample who could not be assigned a telephone number, so that in each quarter 15 000 people are available for the gross sample of the quarter, from which a net sample of 3 000 people per quarter is to be realised for the survey on tourism acceptance. For each person in the gross sample, personal data such as first name, surname, gender, date of birth and address of main residence are available, which are necessary for making contact. After the end of the survey, all data required for this purpose is destroyed in accordance with data protection law. The data is pseudonymised at the earliest possible point in time and later only used in categories (such as age) in analyses according to socio-demographic variables, so that no conclusions can be drawn about the responses of individuals.

2.4 Questionnaire

When creating the questionnaire, the **main objective** was to obtain as much information as possible with as few questions as possible in order to capture the resident population's attitude towards tourism without overburdening respondents

The questionnaire consists of **four question blocks with filters**, so that a minimum of six questions and a maximum of eight questions on tourism acceptance are asked. All possible answers are to be selected using the single-choice method, unless specifically mentioned.

An overview of the questionnaire is presented below; the complete questionnaire can be found in the appendix:

1. The first block of questions deals with the **impact of tourism** with the main question G1 "How do you personally rate the impact of tourism on your place of residence?" with the answer options "Predominantly positive", "Rather positive", "Neutral", "Rather negative", "Predominantly negative" and "Don't know". The follow-up question is only asked if respondents rate the impact of tourism on their place of residence as "Predominantly positive" or "Predominantly negative". A written statement is requested as to why the respondent comes to this assessment (G1_1 "Why do you rate the impact of tourism on your place of residence as predominantly positive/predominantly negative?"). This open question allows a qualitatively more in-depth assessment and analysis of potential fields of action for tourism policy and actors in destination management.

2. The second block of questions asks how the **importance of tourism** is perceived by the population. On the one hand, this is surveyed in relation to the place of residence and on the other hand for the whole of Austria in order to have a comparative value. The questions are G2_1 "In your opinion, what importance does tourism (i.e. overnight and day trips) generally have for the economy, labour market and leisure activities in your place of residence?" and G2_2 "In your opinion, what importance does tourism (i.e. overnight and day trips) generally have for the economy, labour market and leisure activities in Austria?" with the answer options "High importance", "Medium importance", "Low importance" and "Don't know".

3. The third block of questions aims to cover the **perceived intensity of tourism**, for which the following questions are asked in relation to the place of residence and Austria as a whole: G3_1 "How do you personally feel about the number of tourists in your place of residence?" and G3_2 "How do you personally feel about the number of tourists in Austria overall?". The answer options for these questions are on a 5-point scale from "There are too few tourists.", "There are rather few tourists.", "The number of tourists is right for me." to "There are rather many tourists." and "There are too many tourists.", as well as "Don't know". In order to also reflect the seasonality of tourism in Austria in the questions, there is another additional question in this question block for all those respondents who state "There are rather many tourists." or "There are too many tourists." in the question about the perceived intensity of tourism in their place of residence. Here, the question G3_1_1 "When do you feel that there are rather many/too many tourists in your place of residence?" asks when they feel this way in order to recognise seasonal fluctuations. G3_1_1 is a multiple-choice question with the options "All year round", "In spring", "In summer", "In autumn", "In winter", "On other occasions", "Never" and "Don't know".

4. The fourth block of questions is a further socio-demographic characteristic that deals with the **occupational dependency** of the person, in order to be able to analyse the data obtained in this context. The question for this is G4 "What importance does tourism have for your professional or financial situation?" with the completion note that the respondent should please think about their income, as the person's financial dependence on tourism is to be surveyed here. Respondents can choose from "Very high importance", "High importance", "Medium importance", "Low importance", "No importance at all" and "Don't know".

2.5 Quality assurance – Pre-Test

New surveys must undergo a pre-test for **quality assurance reasons**, which is why the prescribing federal ministry in Austria (BMAW) commissioned Statistics Austria to carry out a pre-test for the tourism acceptance survey. The pre-test was to be carried out within the same framework as the real survey and served the purpose of estimating the response rate of the survey, checking the preparatory questions for comprehensibility and usability, obtaining direct feedback from the respondents and using the results to test whether analyses and links with the main survey and other statistics are possible in a representative manner.

2.5.1 Methodology for the pre-test

The pre-test on tourism acceptance was carried out as part of the travel behaviour survey relating to the **reference period July to September 2023** using the same survey design and sampling basis as the real survey. The pre-test started with the mailing of the postal invitation to the online survey on 27 September 2023 and ended on 5 November 2023. The subject of the pre-test was the tourism acceptance, which in the context of this survey means the measurement of the attitude of the Austrian resident population regarding the impact, importance, volume and financial dependence on tourism.

The pre-test **questionnaire** comprised questions that were similar or even identical in meaning to those described in Chapter 2.4 Questionnaire, with the exception of the question on the seasonality of the perceived intensity of tourism, as well as additional feedback questions on comprehensibility and general comments on the questions. The population of the pre-test was 7.86 million people (people aged 15 and over with their main residence in Austria) and the gross sample, which was determined according to the procedure described in Chapter 2.3 Sample, was 15 000 people living in Austria who were invited to take part in the one-off, voluntary survey. The target utilisation for the pre-test was 3 000 CAWI interviews. The gross sample was contacted twice by post at the address of their main place of residence during the survey period. The first letter was a general invitation to participate in the two surveys online and if participation did not take place within two weeks, a reminder letter was sent to the person. The survey period was completed after 39 days.

2.5.2 Data processing and results

At the end of the pre-test survey phase, the completed interviews on tourism acceptance were adjusted for those who did not answer all the questions in full, so that work continued with a net sample of 3 579 complete interviews. This results in a **response rate of 24%**, which is at a similarly high level as the voluntary survey on travel behaviour.

“Don't know” or "Don't specify" responses were not **imputed**, as a "don't know" can be counted as a legitimate response in the area of tourism acceptance. This information was assigned to the corresponding “Don't know” answer option for the respective question and thus taken into account in the data analysis. The net sample was weighted according to age x federal province x gender and adjusted to the additional factors “income” and “education” in a methodical procedure in line with the sampling criteria.

With the adjusted and weighted data, the questions on tourism acceptance were analysed both individually and in **combination** or linked with socio-demographic variables such as age, gender, federal province of residence, highest completed school education or current occupation. The aim of the analyses was to show exemplary results and statements from the data; based on this, it was examined whether the questions asked can depict reliable and valid results on tourism acceptance. From the results it could be concluded that all questions at national level already provide plausible and reliable data on tourism acceptance on a quarterly basis and fit with knowledge from the industry and past surveys.

The pre-test made it clear that analyses at federal province level are only possible on an annual basis, as the quarterly sampling error at federal province level is too high to provide valid data. Valid analyses at regional level are not possible on an annual basis based on the previous sample. The main results of the pre-test were presented to representatives of the ministry at a workshop on 9 January 2024.

2.5.3 Feedback and resulting changes

Another aim of the pre-test was to obtain **feedback directly from the respondents** regarding the comprehensibility and answering of the questions. This analysis lead to the following conclusions:

- 3 out of 4 people found answering the questions easy or rather easy.
- If answering the questions was perceived as difficult or rather difficult (3% of all respondents), it was because
  - they had no insight into the tourism situation in their place of residence or in Austria as a whole and were therefore unable to make a judgement,
  - the definition of place of residence was unclear (especially in the case of Vienna, whether the district of residence or the entire city was meant),
  - there is no/hardly any tourism in their place of residence,
  - they did not understand the meaning behind the questions or
  - the questions and possible answers left too much room for interpretation.
- For questions that required an assessment of the tourism situation in Austria as a whole, it was criticised that this did not take into account the regional nature of tourism in Austria.
- Similarly, the feedback indicated that seasonality, particularly in terms of the perceived intensity of tourism, was not taken into account.

It can be concluded from the respondents' feedback that the questions asked on tourism acceptance provide valid results. Nevertheless, some questions had to be slightly clarified in terms of comprehensibility in order to largely avoid too much room for interpretation on the part of the respondents and thus keep the results comparable and reliable in the long term. The questions were revised in close collaboration with the prescribing federal ministry in Austria (BMAW). Here, the focus was placed on levelling out misunderstandings as far as possible with the help of explanatory texts, avoiding ambiguous terms in the questions and covering the seasonality of Austrian tourism with an additional question.

3 Data processing (imputation, extrapolation)

At the end of the reporting period, the completed interviews on tourism acceptance are adjusted each quarter for those who did not answer all the questions in full, so that only complete interviews are used for further work. Table 2 provides an overview of the gross sample, the net sample and response rate achieved for the 2024 reporting year. It also shows how many respondents abandoned the questionnaire after the travel behaviour survey and did not complete the tourism acceptance survey.

Table 2 Overview of gross sample, net sample, response rate in %, drop out in % for the reporting year 2024

Quartal	Gross sample	Net sample tourism acceptance	Response rate in %	Drop-Out from travel behaviour part to tourism acceptance in %
1st quarter 2024	15 000	3 524	23%	0,6%
2nd quarter 2024	15 000	3 351	22%	0,9%
3rd quarter 2024	15 000	3 532	24%	1,4%
4th quarter 2024	15 000	3 894	26%	1,7%

The data from the net sample is **micro-plausibility checked** before extrapolation so that any implausible cases are completely excluded from the net sample. As the extrapolation of the data on tourism acceptance is based on the main survey on travel behaviour, all those cases that are identified as incorrect or implausible in the micro-plausibility check of the travel behaviour survey and are therefore excluded from the extrapolation are also excluded from the net sample on tourism acceptance. This ensures, among other things, that for each case of tourism acceptance there is also the corresponding data on travel behaviour, on which the synergies of the two surveys are based. "Don't know" or “Don't specify” responses are not imputed in the survey on tourism acceptance and these responses are assigned to the “Don't know” response option for the respective question.

The sample results are **extrapolated** to the population. The characteristic distributions for the population are derived from the characteristic distributions in the sample. The extrapolation of the results of travel behaviour and tourism acceptance is carried out quarterly and the weights of tourism acceptance are based on the calculated weights of the travel behaviour survey. The extrapolated results of tourism acceptance add up to the population of the respective quarter.

The first weighting step for this process is the calculation of the non-response adjusted design weights for the travel behaviour survey, which are defined as the ratio between the total population in a stratum according to the micro census survey and the number of respondents in that stratum. There are 108 strata defined by six age groups, nine federal states and two genders (non-binary genders are treated with the even/odd birthdays method to assign them to the male or female gender) (see chapter 2.3 Sample). The second weighting step is a more detailed non-response adjustment using a logistic regression model with the variables

- Income quintuples,

- Equivalent income quintuplets,
- employment status,
- nationality (grouped),
- education
- Age groups,
- household size,
- gender and
- (proposed) mode.

The final weighting step is a calibration based on the total number of people by age group x federal state x gender, by income quartile and by education (5 groups).

For the Tourism Acceptance Survey, the weights calculated for the travel behaviour survey are calibrated so that, despite a lower response rate, they still add up to the total population. In order to obtain annual results from the quarterly results of tourism acceptance, the quarterly weights are divided by four so that each case in the net sample is always assigned two weights, a quarterly and a yearly weight. In addition, the sampling error is also estimated on a quarterly basis using the standard deviation of 1 000 bootstrap repetitions.

4 Analyses and results

After data preparation, the weighted data is summarised in results tables. The results tables represent the breakdown of the tourism acceptance data with the respective socio-demographic variables and the occupational dependency collected in the tourism acceptance survey in the form of cross tables. The statistical programme R is used to prepare the data and create the results tables, which are saved in .xlsx format, and further analyses are carried out either in R or in the statistical software SPSS.

It is planned to **link the data with other statistics**, such as the national accommodation statistics or the travel behaviour of the Austrian resident population, and evaluate them accordingly. In an analysis with the national accommodation statistics, the comparison of the tourism acceptance results of respondents from communities or regions with a high number of beds and tourism intensity (= overnight stays per inhabitant) with those from less touristy communities would provide a further perspective on the phenomenon of tourism. Analyses of tourism acceptance in connection with the travel behaviour of the respondents can be carried out with all variables of the travel behaviour survey. Particularly useful here would be the analysis of travel intensity, i.e. whether a person has travelled at least once in the reporting year, broken down into domestic and international trips in combination with the person's acceptance of tourism. All results and analyses are then prepared graphically and in writing for publication[3].

The **results of the open question** G1_1 are determined by means of manual categorisation in a dynamic process based on the principle of dual control. The process is dynamic because the categories do not exist before the evaluation and grow with the evaluation, so that new categories are added or categories that are no longer mentioned can be omitted each reporting year. There is one set with positive and one with negative categories. In this process, each response is assigned to at least one category in the respective set, whereby there can be no overlaps between the positive and negative categories. In other words, an answer cannot fall into both a positive and a negative category. There is no upper limit to the number of categories an answer can fall into. The categories determined are shown separately as word clouds in the results presentations, whereby the size of the word in the word cloud depends on the frequency of the category mentioned.

4.1 Tourism Acceptance Score

In order to make the results of the tourism acceptance survey easy to process and understand for the general population, the **tourism acceptance score** (**TAS**) for the place of residence is to be calculated from the answers to question G1 ("How do you personally rate the impact of tourism on your place of residence?"), as developed in Schmücker & Eisenstein (2021).

[3] The results for the 2024 reporting year have not yet been published at the time of writing and are expected to be available at www.statistik.at/statistiken/tourismus-und-verkehr/tourismus/tourismus-akzeptanz by the end of June 2025.

In the tourism acceptance score, the answer options "predominantly positive" and "rather positive" are summarised as positive effects and "predominantly negative" and "rather negative" as negative effects. The balance is intended to represent the balance between the positive and negative effects and is calculated from the extrapolated data using the following formula, where "n" corresponds to the population, i.e. the Austrian resident population aged 15 and over in the reporting year:

$$TAS = \frac{(predominantly\ positive + rather\ positive) - (predominantly\ negative + rather\ negative)}{n} * 100$$

Alternatively: $TAS = [predominantly\ positive\ (in\ \%) + rather\ positive\ (in\ \%)] - [predominantly\ negative\ (in\ \%) + rather\ negative\ (in\ \%)]$

The result of the TAS is therefore given in percentage points and can range from -100 to +100. A negative TAS means that the negative side of the scale predominates, while a positive TAS means that the positive side of the scale is more pronounced. The "neutral" and "don't know" response options are not taken into account in the calculation.

4.2 Small Area Estimation Model

Due to the characteristics of the proportionally stratified random sample (as described in Chapter 2.3 Sample) and also confirmed by the pre-test (see Chapter 2.5.2), it is only possible to analyse the tourism acceptance data representatively on the basis of the sample at NUTS 2 level (federal provinces). The intensity of tourism, destination management and thus also tourism acceptance varies greatly in Austria, even within the federal provinces. The collection of representative data at **regional or municipal level** is associated with very high costs and burdens on the population and is therefore hardly feasible. For this reason, Statistics Austria has developed a Small Area Estimation model (SAE), which is based on other tourism indicators and statistics that can influence tourism acceptance at municipal level.

The basis for the model is the resulting variable from question G3_1 (perceived tourism intensity at the place of residence) and the weights calculated for each person in the net sample. For the estimation, the answer options of G3_1 are summarised in order to be able to make a binary estimate. The answer options "There are rather many tourists." and "There are too many tourists." take the value 1, which stands for "rather many or too many tourists", and the opposite is summarised with the answer options "There are too few tourists", "There are rather few tourists", "The number of tourists is right for me." and "Don't know" in the value 0, which in a broader sense means "neither rather many nor too many tourists".

For the model, the actual persons from the net sample are linked with other administrative data, such as income, the sector the person is employed in, and data on the municipality (e.g. income from tourism sectors, number of overnight stays per inhabitant). Table 3 describes all the data included in more detail. The annual population for the model is all those persons who are included in all four rich frames of the quarterly sampling and those persons who took part in the survey but were not included in all four frames, i.e. who deregistered their main residence in Austria in the course of a year. Therefore, the

population of the SAE also differs minimally from that of the descriptive statistics. The quarterly extrapolation weights must therefore also be scaled in order to obtain the total number of people in the population. The scaling factor is calculated by dividing the number of people in the population by the sum of the quarterly extrapolation weights.

Table 3 Variables of the Small Area Estimation Model for tourism acceptance

Variable	Ausprägung	Bedeutung	Datenquelle
G3 simplified	0 = " There are too few tourists.", " There are rather few tourists.", " 3. The number of tourists is right for me.", "Don't know" 1 = " There are rather many tourists.", " There are too many tourists."	Perceived number of tourists in the place of residence	Tourism acceptance survey
Gender	Male, female	Gender of the person (non-binary genders are treated using the even/odd birth date method so that they are categorised as male or female)	ZMR
Country of birth	Austria, EU, other	Country of birth of the person	ZMR
Country of citizenship	Austria, EU, other	Country of citizenship of the person	ZMR
Age	Age in years	Age of the person at the time of the survey	ZMR
Income	In € (gross)	Income of the person	Income tax and social security data
Share of income below 1st quintile	Persons in %/municipality	Proportion of people in the municipality who earn less than the 1st quintile in Austria	Income tax and social security data
Share of income above 4th quintile	Persons in %/municipality	Proportion of people in the municipality who earn more than the 4th quintile in Austria	Income tax and social security data
Bed places per inhabitant	Number of bed places/municipality/inhabitant	Number of bed places per inhabitant per municipality by winter and summer season (average)	Accommodation statistics
Accommodation establishments per inhabitant	Number of accommodation establishments/municipality/inhabitant	Number of accommodation establishments per inhabitant per municipality by winter and summer season (average)	Accommodation statistics
Arrivals per inhabitant	Number of arrivals/municipality/inhabitant	Number of arrivals per inhabitant and municipality each quarter	Accommodation statistics

Overnight stays per inhabitant	Number of overnight stays/municipality/inhabitant	Number of overnight stays per inhabitant and municipality each quarter	Accommodation statistics
Employees in NACE08 = I55	In persons/municipality	Total number of employees in workplaces with NACE08 = I55 (accommodation) per municipality (category 1)	Structural Business Statistics Survey
Revenue in NACE08 = I55	In 1 000€/municipality	Sum of revenue of workplaces with NACE08 = I55 (accommodation) per municipality (category 1)	Structural Business Statistics Survey
Employees in NACE08 = I56	In persons/municipality	Total number of employees in workplaces with NACE08 = I56 (accommodation) per municipality (category 2)	Structural Business Statistics Survey
Revenue in NACE08 = I56	In 1 000€/municipality	Sum of revenue of workplaces with NACE08 = I56 (accommodation) per municipality (category 2)	Structural Business Statistics Survey
Employees in NACE08= R, H49391, H50100, H50300, N77210 (Kategorie 3)	In persons/municipality	Total number of employees in workplaces with NACE08 = R, H49391, H50100, H50300, N77210 per municipality (category 3) [incl. „Arts, entertainment and recreation“, „Cableway, chairlift and tow lift transport“, „Sea and coastal passenger water transport“, „Inland waterway passenger transport“, „renting of sports and leisure equipment“] [excludes R92003, R93130, R92001 („Betting, tote and lottery activities“, „Operating of gaming machines“ und „Fitness centers“)]	Structural Business Statistics Survey
Revenue in NACE08= R, H49391, H50100, H50300, N77210	In 1 000€/municipality	Sum of revenue of workplaces with NACE08 = R, H49391, H50100, H50300, N77210per municipality (category 3) [included & excluded see employees with NACE08 = R, H49391, H50100, H50300, N77210]	Structural Business Statistics Survey
Occupation in NACE classification according to category 1	0 = no 1 = yes		Register-based census
Occupation in NACE classification according to category 2	0 = no 1 = yes		Register-based census
Occupation in NACE classification according to category 2	0 = no 1 = yes		Register-based census
Occupation in NACE classification according to category 0 (=none of the above-mentioned NACE Codes)	0 = no 1 = yes		Register-based census
Occupation in NACE classification unknown	0 = no 1 = yes		Register-based census

After these preparatory steps, a **machine learning model**, an XGBoost model (Chen & Guestrin, 2016), is trained with the data on the people from the survey and the linked administrative data so that it can estimate whether a person would answer question G3_1 with 0 (="not rather many nor too many tourists") or 1 (="rather many or too many tourists"). The scaled annual weights are transferred to this model. The answers of the remaining people in the population are estimated in such a way that there are two probabilities per person - one for the value 0 and one for the value 1. The probabilities of the people in the net sample are always 1 for their actual answer and 0 for the rest. For the presentation of the results, the probabilities are then aggregated at municipality level (sum of the probabilities by the number of people in the municipality), resulting in an estimate for the proportion of people in the municipality who perceive the number of tourists as rather much or too much (value = 1), and one for the proportion of people in the municipality who do not (value = 0). In total, the estimators for value 0 and value 1 always sum up to 1 or 100 % per municipality.

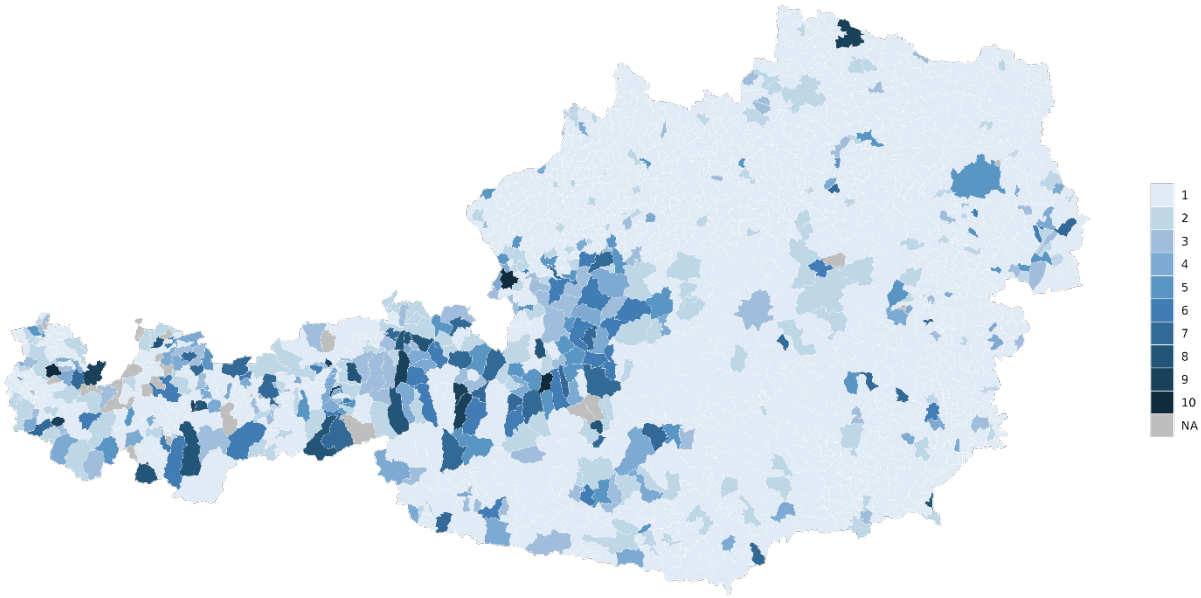
For the **error estimate**, the process (train model, estimate percentages) is repeated 1 000 times. The weights used in these models are the 1 000 bootstrap weights from the quarterly extrapolation of tourism acceptance, scaled by the same scaling factor computed for the quarterly extrapolation weights in the previous step. This results in 1 000 estimated values per person, from which the standard deviation can be calculated. The standard deviation can then be used to construct the confidence intervals (CI), which indicate the certainty of an estimated value or how large the error of the estimated value could be. The smaller the confidence interval, the more reliable the estimated values are. The confidence interval ranges from the 2.5 quantile to the 97.5 quantile, which means that the true value can be said to lie within this interval with 95% probability. An example of this would be that if the estimated value for municipality A is 40% for value 1 ("There are rather many or too many tourists") and the 95% confidence interval ranges from 38-41%, then it can be claimed with 95% probability that the true value for municipality A is between 38% and 41% for value 1.

For the **presentation of the results** of the small area estimation model, an estimated value is selected, in this case the estimated value for value 1, so that the proportion of people per municipality who perceive the number of tourists in their place of residence as rather many or too many is shown. The results per municipality are then displayed in colour on a map of Austria (a sample of the display from the results of the pre-test can be seen in Figure 1). Before the graphical presentation, two further adjustments are made in order to simplify the results and present them in a statistically correct manner:

1. For municipalities whose 95%-confidence interval is wider than 10, no values are displayed when the results are shown. The data is therefore blocked because the error probability is too high.

2. Before the graphical processing, the results are divided into intervals of 0-10 %, 11-20 %, 21-30 %, 31-40 %, 41-50 %, 51-60 %, 61-70 %, 71-80 %, 81-90 %, 91-100 % and NA, which shows those municipalities that are blocked.

Figure 1 Sample presentation of the results of the Small Area Estimation Model on tourism acceptance: proportion of people who perceive the number of tourists as rather many or too many



Source: Pre-Test Tourism acceptance Q3 2023, Statistics Austria.

5 Conclusion

The development of **sustainability indicators in tourism** is a high priority worldwide, but also at national level. With the amendment of the Tourism Demand and Acceptance Statistics Ordinance, Austria is providing an internationally noteworthy example of how tourism acceptance can be surveyed with few variables and little additional effort and cost at national and - based on a small area estimation model - at regional level. This is the first time that Statistics Austria has provided data on the social sustainability of tourism on a legal basis, creating transparency and enabling evidence-based initiatives and measures on the part of tourism policy.

The survey on tourism acceptance in Austria is based on a sample survey that has been established for decades and its survey procedure and sample in order to measure and process the attitude of the Austrian resident population with regard to the impact, significance, volume and occupational dependency on tourism. Before the start of the real survey in April 2024, a comprehensive pre-test was carried out in October 2023, on the basis of which the final questionnaire was optimised and supplemented by a further question on the seasonality of the perceived number of tourists.

The methodological basis of the Tourism Acceptance Survey, namely that it is conducted as a supplementary survey to an established international statistic, has the **advantage** that the new data can be collected cost-efficiently and with minimal burden for the respondents. The fact that Statistics Austria carries out this survey on the basis of an amended legal basis means that it is secured in the long term, so that in future reliable annual comparisons of tourism acceptance in Austria will be possible. This also makes it easier to link the tourism acceptance results with other nationally produced statistics and available data, as required for a small area estimation model.

6 Prospects

The survey on tourism acceptance in Austria and its legal anchoring in the Regulation on Tourism Demand, which is based on Regulation (EU) No. 692/2011 of the European Parliament and of the Council, should serve as an example for other EU and non-EU countries that the survey of tourism acceptance, a key indicator of social sustainability in tourism, is also possible at national level and with comparatively little financial effort. Statistics Austria and the responsible Austrian ministry endeavour to pass on their knowledge of tourism acceptance measurement to interested parties in the tourism industry and statistics community, e.g. at specialist conferences, meetings of international committees or through bilateral exchange. In addition, Statistics Austria offers Austrian regions or municipalities the opportunity to make all variables on tourism acceptance available to the corresponding region or municipality by increasing the sample for a fee; this provides the commissioning region or municipality with a representative net sample for analyses.

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Annex – Full questionnaire 2024

ONLY when the questionnaire is answered online:

Acceptance of Tourism in Austria

So far, we have asked you whether and how you have travelled in Austria and abroad.
Now we would like to ask you a few general questions about **your attitude towards tourism** in your place of residence and in Austria.

Question G1

How do you personally rate the impact of tourism on **your place of residence**?

Please really only think of your place of residence/municipality of residence.

1. Predominantly positive *(Filter to G1_1: Why?)*
2. Rather positive
3. Neutral
4. Rather negative
5. Predominantly negative *(Filter to G1_1: Why?)*
6. Don't know

Question G1_1

Why do you rate the impact of tourism on where you live as *predominantly positive/negative*?

Please briefly explain the reason for your answer.

Question G2_1

In your opinion, what importance does tourism (i.e. overnight and day trips) generally have for the economy, labour market and leisure activities in **your place of residence**?

Please really only think of your place of residence/municipality of residence.

1. High importance
2. Medium importance
3. Low importance
4. Don't know

Question G2_2

In your opinion, what importance does tourism (i.e. overnight and day trips) generally have for the economy, labour market and leisure activities in **Austria**?

Please answer with your personal perception for the whole of Austria here.

1. High importance
2. Medium importance
3. Low importance
4. Don't know

Question G3_1

How do you personally feel about the number of tourists in **your place of residence**?

Please really only think of your place of residence/municipality of residence.

1. There are too few tourists.
2. There are rather few tourists.
3. The number of tourists is right for me.
4. There are rather many tourists. *(Filter to G3_1_1: Seasonality)*
5. There are too many tourists. *(Filter to G3_1_1: Seasonality)*
6. Don't know

Question G3_1_1 Seasonality

When do you feel that there are rather many/too many tourists in your place of residence? *Multiple answers possible*

1. All year round
2. In spring
3. In summer
4. In autumn
5. In winter
6. On other occasions (e.g. events)
7. Never *(**Warning**: Are you sure? You have said before that you think Answer of G3_1 in your place of residence.)*
8. Don't know

Question G3_2

How do you personally feel about the number of tourists in **Austria overall?**

Please answer with your personal perception for the whole of Austria here.

1. There are too few tourists.
2. There are rather few tourists.
3. The number of tourists is right for me.
4. There are rather many tourists.
5. There are too many tourists.
6. Don't know

Question G4

What importance does tourism have for your professional or financial situation?

Please think about where your income comes from.

1. Very high importance
2. High importance
3. Medium importance
4. Low importance
5. No importance at all
6. Don't know