

Survey on Equipment and Use of Information and Communication Technologies in Households. Year 2012 (ICT-H. 2012)

Methodological report

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1 Presentation of the survey

The general objective of the Survey on the Equipment and Use of Communication and Information Technologies in Households (ICT-H) is to obtain data on the development of what is known as the *Information Society*.

The survey has the following specific objectives:

1. To ascertain the information and communication technologies equipment in Spanish households (ICT products: television, landline and mobile phone, computer equipment.).
2. To ascertain the use that the Spanish population makes of Internet and e-commerce.
3. To serve as a base to establish comparisons between Spain and other countries and meet the requirements of international institutions.
4. To obtain information that is comparable between Autonomous Communities.

1.1 General description of the survey

In 2004 the survey started to be conducted continuously, as a 'Rotating Panel', in other words, the same dwellings (panel) are investigated over various years, with a quarter of the sample being renewed (i.e. rotating) every year.

The sample was obtained from the continuous municipal register of inhabitants. It comprised 2,578 census sections distributed by Autonomous Community. Eight main dwellings were selected within each section, and 6 reserve dwellings were also selected in case incidents were to arise regarding the main dwellings.

In the first wave of 2005 the corresponding quarter of the sample of dwellings was renewed. As regards the rest of the sections, the main and reserve dwellings that filled in the 2004 questionnaire are maintained (they are all considered main dwellings in 2005), as are the reserves that were not used before to replace main dwellings (they are still considered reserves in 2005).

The sample for the ICT-H 2005 survey was selected from 28,224 dwellings, 23,682 of which were main dwellings and the rest reserve dwellings that are used if something happens to the main dwelling. From this year, all first interview sections will have eight reserves, rather than the six for previous surveys, in order to reduce the loss of "effective" sample which occurs over time.

The same procedure was used in in all subsequent waves (second wave of 2005, first wave of 2006, second wave of 2006, 2007, 2008, 2009, 2010, 2011 and 2012). In this latest survey, the size of the sample was 20,647 main households (13,257 CATI and 7,390 CAPI), there also having been used 2,914 reserves to ensure the optimal population coverage by Autonomous Community, whereby the number of dwellings visited was 23,561. The total number of sample sections in 2012 was 2,530, since there are sections with dwellings in CATI, and at the same time in CAPI.

TIC-H 2012

Number of CAPI and CATI visited dwellings and sections, by province

Province	CATI		CAPI	
	Dwellings	Sections	Dwellings	Sections
01 Araba/Álava	113	15	74	11
02 Albacete	141	21	107	22
03 Alicante/Alacant	337	49	307	43
04 Almería	116	17	72	13
05 Avila	42	6	55	6
06 Badajoz	366	53	303	53
07 Balears, Illes	513	75	530	68
08 Barcelona	974	141	657	123
09 Burgos	118	18	92	14
10 Cáceres	264	37	192	31
11 Cádiz	225	34	145	28
12 Castellón/Castelló	139	18	71	10
13 Ciudad Real	186	25	128	22
14 Córdoba	163	23	93	17
15 Coruña, A	359	49	231	39
16 Cuenca	82	12	58	8
17 Girona	126	18	94	15
18 Granada	164	24	121	20
19 Guadalajara	72	10	53	11
20 Gipuzkoa	262	36	136	30
21 Huelva	96	14	63	12
22 Huesca	107	15	78	13
23 Jaén	159	21	49	10
24 León	135	24	184	27
25 Lleida	70	10	43	9
26 Rioja, La	433	63	390	68
27 Lugo	110	15	85	13
28 Madrid	1,060	152	884	143
29 Málaga	254	38	204	36
30 Murcia	571	81	453	76
31 Navarra	649	87	389	61
32 Ourense	107	15	84	12
33 Asturias	661	90	448	79
34 Palencia	62	9	36	8
35 Palmas, Las	289	50	362	47
36 Pontevedra	263	37	210	34
37 Salamanca	116	18	80	16
38 Santa Cruz de Tenerife	226	40	351	50
39 Cantabria	491	68	417	64
40 Segovia	54	7	31	4
41 Sevilla	339	50	231	46
42 Soria	32	5	42	5
43 Tarragona	104	17	103	17
44 Teruel	78	12	59	11
45 Toledo	231	31	140	24
46 Valencia/València	548	76	438	67
47 Valladolid	165	22	80	14
48 Bizkaia	411	56	356	47
49 Zamora	65	10	43	10
50 Zaragoza	471	65	343	56
51 Ceuta	70	10	69	11
52 Melilla	68	10	40	7
	13,257	1,899	10,304	1,681
	Total		Total	
	Dwellings	23,561	Sections	2,530

* In Ceuta 16 visits to dwellings are included (1 Complete section), the details of which have been deleted due to not containing valid information.

The dwellings in sections undertaking the first interview and dwellings without a telephone were interviewed via personal interview with tablet (CAPI).

All other dwellings were interviewed by telephone, recording the survey on an electronic questionnaire from CATI centres.

The field work was conducted all over Spain. The collection period, from the CAPI centres, was from 23 January to 31 May 2012, while from the CATI centres, it was from 30 January to 11 May 2012.

The population object of investigation (objective population) are persons who live in main family dwellings. Although persons of all ages form part of the objective population, not all persons are investigated exhaustively, as they are only eligible for an exhaustive investigation of persons 16 and over at the time of the interview, of whom one is selected.

For the questionnaire, the table "Household members" is filled in first of all to decide which persons are household members and which are surveyable (household members aged 16 and over). In order to provide this data, an informant is required who is a member of the household and is aged 18 or over).

The selection of the person to survey is made electronically by means of a random procedure.

Blocks II and III deal with the equipment of the household as to ICT products: television, computer, telephone, etc, and whether or not the household has Internet access.

Block IV is filled in if there are children aged 10-15 in the household. There is a series of questions for all of them related to the use of computers, the Internet and mobile phones.

Blocks II to IV may be filled in by the initial informant or the selected person.

Blocks V to IX deal with the use of computers, the Internet, the use of the Mobile Web, e-Government, e-commerce and the X asks about some socio-economic data on the selected person. Only the selected persons may respond.

1.2 Organisation of field work

Data was collated in two ways:

- Personal interview with laptop computer or tablet (CAPI): The interviewer does not use paper questionnaires, rather s/he has a laptop computer onto which the questionnaire has been uploaded, so that interviews may be carried out with this laptop computer.

By using this method, households from sections with a new sample and households already included in the 2011 sample for whom there is no contact telephone, are interviewed.

- Telephone interview in a CATI centre: households from the 2011 sample are interviewed by phone from a CATI centre as long as they have a telephone number. The interviewer does not use paper questionnaires but rather records responses from the informant on the electronic questionnaire directly.

The CATI centres are located in the Delegations of Madrid, Barcelona, Cádiz, Coruña, Sevilla, Valencia and Bizkaia and each one of them calls the following provinces:

Province where the CATI centre is located	Provinces from where information is collected
Madrid	Albacete, Avila, Burgos, Ciudad Real, Cuenca, Guadalajara, Rioja, Madrid, Palencia, Salamanca, Segovia, Soria, Toledo, Valladolid and Zamora
Barcelona	Baleares, Barcelona, Girona, Lleida and Tarragona
Coruña	Coruña, León, Lugo, Ourense, Asturias and Pontevedra
Cádiz	Almería, Cádiz, Granada, Jaén, Málaga, Las Palmas, Tenerife and Ceuta and Melilla
Sevilla	Badajoz, Cáceres, Córdoba, Huelva and Sevilla,
Vizcaya	Araba/Alava, Gipuzkoa, Navarra, Cantabria and Bizkaia
Valencia	Alicante, Castellón, Huesca, Murcia, Teruel, Valencia and Zaragoza

In CATI centres, personnel worked in two shifts from Monday to Friday. The first shift covered the interval from 9 am to 3 pm and the second from 3 pm to 9 pm.

Each sample section is allocated a week of initial work, plus 3 weeks more in order to make up any absent or inaccessible dwellings. The survey letters of introduction are sent the week prior to the first week of section work.

As regards personnel contracted for the survey, it is worth noting that there were 14 Interviewer Inspectors and 45 Interviewers for 13,257 CAPI main households; 24 Interviewer Inspectors in the field and 128 Interviewers in the field, for 7.390 CAPI main households.

1.3 Incidents concerning dwellings and groups and their treatment

The **dwelling keys** considered are:

- Unlocatable dwelling (IL)

In CAPI this incidence occurs when the dwelling is not located by an error in the entry address. The dwelling may not be located on the address that appears on the list of dwellings selected either because the address is incorrect, is duplicated with another dwelling included in the sample or because the dwelling does not currently exist.

This incidence does not exist in CATI.

- Dwelling used for other purposes (OF)

The household selected is dedicated entirely to purposes which are different from family residence. For example: convent, old people's home, garage, office, etc.

- Inaccessible dwelling (IN)

In CAPI this is the dwelling which cannot be accessed to carry out the interview due to geographical climatological (floods, snowfall, etc.) changes (when there are no routes to arrive there) or any other type of changes.

In CATI this incidence is automatically assigned when the telephone recorded for a dwelling does not correspond to the address in which the interview may be conducted and it is not possible to locate a correct telephone.

- Empty dwelling (V)

The dwelling selected is not a main dwelling, it may be a temporary dwelling (inhabited or uninhabited at the time of the interview) or inhabited for any reason, such as death or change of residence of persons who live there.

- Previously selected dwelling (SA)

This is the dwelling which, having been selected previously (less than five years ago) in the sample of any other INE population and household survey, and having taken part therein, is selected again

- Surveyable dwelling (E)

The **group keys** considered are:

- Total refusal (NT)

This is considered when it has not been possible to conduct the interview and the cause is the subsequent outright refusal of the initial informant after having started to collaborate.

- Refusal from the selected person (NS)

This case is considered as long as the initial informant answers the general household questions but **the selected person refuses to give information** either via an outright refusal as occurs subsequently after initially having started to collaborate.

- Total absence (AT)

This incidence occurs when, after successive visits (in CAPI) or successive calls (in CATI), it is not possible to contact anybody in the dwelling or when it is possible to contact somebody who does not live in the dwelling and who gives information that its occupants are absent.

- Absence of the selected person (AS)

This is used after successive visits to the dwelling have not resulted in interview because the person selected is absent and cannot be contacted.

- Incapacity to respond (IC)

This incidence occurs when it is not possible to carry out the interview due to incapacity to respond whether due to age, disability, illness, lack of knowledge of the language or any other circumstances either from household members as a whole preventing initial contact as well as the selected persons.

In the case of the selected person's incapacity to respond it is admissible for the interviewer to use a third person as an intermediary to obtain the information.

- Surveyed group (E)

When none of the previous incidences occurs and the questionnaire filled in fulfils the requirements to be considered *complete*.

A questionnaire is **complete** if all corresponding questions according to the movement of the electronic questionnaire have been answered.

Moreover, for dwellings collected by means of telephone interview in CATI centres the results of all of them are collected and each one of the calls made.

The possible call results are:

- Not contacted (NC): when nobody answers the telephone or answer phone.

Without a telephone (ST): the telephone does not exist or is a fax or the interviewer verifies that the address to which this telephone corresponds is not the address to be interviewed.

-Engaged (C): the engaged tone.

Contact postponed (AP): the dwelling is contacted but before starting the interview the informant asks to be called at another time to conduct it or there is no valid informant in the dwelling at this time and the call is postponed.

- Partial interview because a new appointment is established (EPC): these are calls in which the questionnaires have been started to be filled in but the informant requests that the interview continue at another time.

- Partial interview interrupted for other reasons (EPO): these are calls in which the interview is interrupted due to the line being cut, problems with the system, etc.

- Interview completed (EF): these are calls in which the survey is completed, either because the questionnaire has been filled out completely, or because there is an incidence in the dwelling which makes it impossible to carry out the questionnaire. Households where the questionnaire is not carried out are regarded as empty (V), used for other purposes (OF), or without a telephone (IN) and also those that are surveyable, but whose human group refuses to take part (NT, NS), is absent (AT, AS) or is unable to respond (IC).

2. Sample design

2.1 Type of sampling

The sample design has been made in the whole country by means of a stratified tri-stage sample.

The first-stage units are the census sections. The second-stage units are main family dwellings. During the third stage, a person is selected in each dwelling who is aged 15 or over. Furthermore, all minors aged between 10 and 15 are also investigated in each dwelling.

The framework used for the sample selection is an area framework formed by the relation of existing census sections on January 1st 2001. Second stage units use the list of main family dwellings in each of the sections selected for the sample obtained from the most up-to-date continuous municipal register of inhabitants available.

Sections are grouped in strata in each Autonomous Community, in accordance with the size of the municipality they belong to.

The following strata have been considered:

Stratum 0: Municipalities with more than 500,000 inhabitants

Stratum 1: Municipalities that are the province capitals with less than 500,000 inhabitants

Stratum 2: Municipalities between 100,000 and 500,000 inhabitants, that are not province capitals

Stratum 3: Municipalities between 50,000 and 100,000 inhabitants, that are not province capitals

Stratum 4: Municipalities between 20,000 and 50,000 inhabitants, that are not province capitals

Stratum 5: Municipalities between 10,000 and 20,000 inhabitants

Stratum 6: Municipalities with less than 10,000 inhabitants

For each Autonomous Community an independent sample is designed from that represented due to one of the survey objectives being to facilitate data with this level of breakdown.

2.2 Size of the sample.- Allocation.

In order to fulfil the goals of the survey, i.e. to provide estimates with a specific degree of reliability on a national level and by Autonomous Community, the investigation uses 2,530 census sections, with 8 dwellings selected in each census section.

In order to obtain a minimum sample size that allows reliable estimates on an Autonomous Community level, the sample is distributed among them by

using a commitment allocation, either uniform or proportional to the size of the Community.

The distribution of the number of sections selected by Autonomous Community is:

Autonomous Community	Number of census sections
Andalucía	280
Aragón	120
Asturias (Principado de)	120
Baleares (Islas)	104
Canarias	128
Cantabria	96
Castilla y León	154
Castilla - La Mancha	132
Cataluña	240
Comunidad Valenciana	188
Extremadura	124
Galicia	154
Madrid (Comunidad de)	202
Murcia (Región de)	112
Navarra (Comunidad Foral de)	116
País Vasco	142
Rioja (La)	90
Ceuta y Melilla (Ciudades Aut.)	28
TOTAL	2,530

Between strata, allocation is proportional strictly to the size of these.

2.3. Sample selection

In order to conduct the ICT-H-12, the selection of first stage units in each stratum has been carried out with probability proportional to the size of each section. In the second stage, dwellings have been selected by means of a systematic sample with random start and equal probabilities of selection for each dwelling in the section. This procedure provides self weighted samples of dwellings in each stratum.

During a third stage, and within each dwelling, a person is chosen with equal probability among those 16 and over.

2.4. Renewal of the sample

Rotating panels are groups of sample sections, which are used to gradually incorporate modifications into the sample, particularly those deriving from the updating of likelihood of the units in the first stage (sections) or rotation of dwellings. The number of sample sections per stratum in each Autonomous Community are distributed so such representation of subsamples that they define is equivalent.

2.4.1. Renewal of the sample of sections. Update of probabilities.

Taking information from the electoral files, Population Censuses or the Continuous Register, section probabilities are updated.

Changes taking place as a result of the update are incorporated on an ongoing into the sample by rotation shift.

In the year 2012 changes were made in rotation shift 3.

The procedure used for updating is the one proposed by L. Kish and A. Scott (JASA 1971).

2.4.2 Renewal of the sample of dwellings.

In order to avoid weariness on the part of families interviewed, as well as giving a likelihood of selection to other, new ones arriving from the census section, the sample of dwellings is partly renewed by rotation shifts.

Therefore, the survey is a rotating panel such that every year the dwellings corresponding to the sections belonging to a specific shift are renewed.

The dwellings from the sections in rotation shift 3 were renewed during 2012.

2.5. Estimators

The following types of estimators have been considered to estimate the survey characteristics:

- Estimator for data on households
- estimator for data on persons aged 16 and over.
- estimator for data on persons aged 10 to 15.

Ratio estimators will be used in all cases, calibrated according to information from external sources.

A). Estimator for data on households

So as to obtain characteristics regarding households, the survey uses an estimator obtained by means of the following steps:

A1) Expansion estimator based on the design factor with correction for non-response on a stratum level.

In each stratum h , the estimator for the total of a characteristic X is obtained by means of the following expression:

$$\hat{X}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{v_{ih(e)}} \frac{V_h}{v_{h(e)}} x_{hij}$$

where:

V_h : Dwellings from stratum h .

$v_{h(e)}$: Size of the effective sample of dwellings from stratum h .

x_{hij} : i Value of the characteristic that is under study in dwelling j of section i .

n_h : Number of sections of the sample from stratum h .

$v_{ih(e)}$: Effective number of dwellings in section i from stratum h .

A2) Separate ratio estimator, to adjust to the population in each stratum h .

$$\hat{X}_h^R = \frac{\sum_{i=1}^{n_h} \sum_{j=1}^{v_{ih(e)}} x_{hij}}{\sum_{i=1}^{n_h} \sum_{j=1}^{v_{ih(e)}} p_{hij}} P_h$$

where:

p_{hij} : Total sample persons (aged 16 and over) from dwelling j , section i .

P_h : Population in stratum h .

A3) The final estimator is obtained by applying reweighting techniques to the previous estimator, using CALMAR software.

As an auxiliary variable, we have used the total dwellings classified by size (5 sizes) for each Autonomous Community. This information is from the Economically Active Population Survey.

B). Estimator for data on persons aged 16 and over

The final estimator is obtained from the individual questionnaire, whose responses come from a person selected among household members aged 16 and over. The estimator is similar to that used in the case of the household but bearing in mind the existence of a factor that incorporates the probability of selection corresponding to the person inside the dwelling.

B1) Estimator based on the design factor with correction for non-response.

$$\hat{X}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{v_{ih(e)}} \frac{V_h p_{hij}}{v_{h(e)}} x_{hij}$$

B2) Separate ratio estimator, to adjust to the population in each stratum.

$$\hat{X}_h^R = \frac{\sum_{i=1}^{n_h} \sum_{j=1}^{V_{h(e)}} p_{hij} x_{hij}}{\sum_{i=1}^{n_h} \sum_{j=1}^{V_{h(e)}} p_{hij}} P_h$$

B3) Implementation of re-weighting techniques by age groups and sex on an Autonomous Community level (CALMAR) with data for the population residing in main family dwellings referring to 15 March 2012, deduced from Population Now Casts made by INE .

C). Estimator for data on persons aged 10 to 15 years

The sampling information relating to all household members between the ages of 10 and 15 is supplied by the person aged 16 or over selected in each household.

The estimator used to obtain the information related to persons aged 10 to 15 is analogous to that described in section A, with the exception of the auxiliary variables, used in calibration (section A.3), which are the figures of resident population in main family dwellings for 10 to 15 years, by sex, in each Autonomous Community, deduced from Population Now Casts made by INE.

2.6. Sampling errors

The indirect Jackknife method is used for the calculation of sample errors of the main characteristics investigated.¹

This method is based on the formation of subsamples in which each one of them is obtained by eliminating a primary unit from the total sample. The estimate of the variance of the estimator has the following expression.

$$\widehat{\text{Var}}(\hat{X}) = \sum_h \frac{(n_h - 1)}{n_h} \sum_{j \in h} (\hat{X}_{(hj)} - \hat{X})^2$$

where:

$\hat{X}_{(hj)}$ is the estimate of X when primary unit j from stratum h is removed from the sample.

\hat{X} is the estimate of X obtained with the whole sample.

n_h is the number of primary units in stratum h .

The sample error allows us to build a numerical interval in which a certain confidence exists, measured in terms of probability, that it contains the true value of the estimated characteristic. The most frequently used confidence

¹ The CALJACK software, developed by P. Lavallè from Statistics Canada was used for this purpose.

interval is that comprised between the estimation, minus 1.96 times the sample error, and the estimation, plus 1.96 times the sample error. This interval has a confidence of 95%, measured in terms of probability, of finding within it the true value of that which is being estimated.

The INE website (<http://www.ine.es/en/>) publishes the sample errors of some of the main variables relating to dwellings, persons (16 to 74 years of age) y children (10 to 15 years of age). They are grouped in three tables located after the results of the Survey, which include information on both a national level and by Autonomous Community. Formally, these errors are expressed as the estimations of *the typical deviations* of the estimators of the characteristics in question, expressed as a percentage, and called *standard errors*.

3. Results of the field work

FINAL SUMMARY OF INCIDENTS

Incidents in households

	Incidents in households								Incidents in households						Reservations	
	Total households	Total completed	E	NT	NS	AT	AS	IC	Surveyable	IN	V	OF	SA	IL	polled	Total polled
Total CATI	13.257	13.257 100,0%	10.099 82,6%	703 5,8%	147 1,2%	1.016 8,3%	174 1,4%	81 0,7%	12.220 92,2%	819 6,2%	207 1,6%	11 0,1%	0 0,0%			
Total CAPI	7.390	7.390 100,0%	4.309 72,4%	936 15,7%	86 1,4%	490 8,2%	76 1,3%	54 0,9%	5.966 80,7%	44 0,6%	1.085 14,7%	60 0,8%	5 0,1%	230 3,1%	1.557 79,4%	
TOTAL	20.647	20.647 100,0%	14.408 79,3%	1.639 9,0%	233 1,3%	1.506 8,3%	250 1,4%	135 0,7%	18.186 88,1%	863 4,2%	1.292 6,3%	71 0,3%	5 0,0%	230 1,1%	1.557 77,3%	

The percentage of the total completed on the total for initial households

Surveyable=E+NT+NS+AT+AS+IC

In incidents E, NT, NS, AT, AS and IC, the percentages are calculated on the surveyable total. For the remainder, the percentages are calculated on the total for completed main households

4. Dissemination of the results

The statistical tables of the results of the survey and the methodological report and other supplementary material will be published on the INE web site (www.ine.es) and, if applicable, in the corresponding electronic publication.

With the aim of achieving greater comparability with the data published by Eurostat, the statistical tables of the ICT-H 2012 results presented refer to dwellings inhabited by at least one person aged from 16 to 74 years and to people in this same age group. In years prior to 2006, the results referred to the total number of dwellings and people aged 15 years old and above.

In successive performing of the survey, n tables relating to dwellings, the main magnitudes refer to ICT equipment in the dwelling (television, computer, telephone, radio, video, etc.), as well as access and way of connecting to the Internet. As regards person, tables, among others, will be created for the use of computers, the Internet and e-mail.

These statistical variables inherent to the survey are cross-referenced with the socio-demographic variables obtained in the same, such as the size of the household and of the municipality where it is located, sex, level of training of the persons, employment situation, etc.