

Towards a standardized burden measurement system for surveys on businesses

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Abstract and Paper

During the second round of the peer reviews on the ESS Code of Practice carried out in 2015, it emerged that Istat already collected information on response burden in some business surveys but not in systematic and standardized way. Thus, an improvement action has been formulated for the definition and implementation of a system of standard indicators for assessing the response burden on businesses and monitoring it over the time, in order to identify critical issues, improve the survey process and the questionnaires design. A Working Group was set up at the end of 2015 with the aim of complying with this task, whose activities are still in progress. The hypothesis formulated by the Working Group on the set of indicators will be described and the first results obtained on the ICT survey presented.

In defining the indicators to be regularly produced, two constraints have been set: do not cause further burden to respondents in order to collect information on burden and contain internal investments to set up IT procedure to estimate burden for the different surveys.

Following these constraints, the ‘actual’ respondent burden has been mainly limited to two measures: time necessary to fill in the questionnaire and time necessary to retrieve information to provide responses.

In practice, time necessary to fill in the questionnaire will be based on the paradata automatically generated by the generalised software system used for electronic questionnaires in the Business Portal Architecture. In particular, the strategy adopted is to process paradata to build an ad hoc data base to be used to systematically produce the burden indicator for each survey, but also to allow the surveys responsables to make all the analysis they could be interested in. This choice is due to need of providing a structured and not redundant informative base, while paradata automatically produced by

IT systems contain millions of records for each survey, most of them not useful for the burden measurement and analysis.

The other measure, time necessary to retrieve information, will be asked to respondents in a small ad hoc section to be added to the questionnaires of each survey. This small section will also contain other two questions regarding the number of persons involved in this task and a third question which investigates some aspects related to other possible causes of burden due to the survey design: questionnaire length, questionnaire design (in term of clarity of questions, support information, question options) usability of the electronic questionnaire (navigation and functions supported), IT problems, etc. The list of options of this question is surely not exhaustive to investigate 'perceived' burden, for example the attitude of the respondent to collaborate is not investigated, but this would need a wider set of questions which would have created other burden. On the other hand, it can be used as an 'alert' of some problems occurring, mainly useful every time the questionnaire is object of deep changes.

In synthesis, a summary report of on response burden will be produced for each survey on businesses as they migrate in the new Business Portal Architecture, containing all the mentioned indicators and further information useful describe the phenomenon.

Besides the burden measured 'per surveys', also the overall burden suffered by businesses will be calculated considering the 'percistency' indicator (number of surveys a single business is asked to provide information for). This datum is systematically produced in the Business Portal Architecture.

Towards a standardized burden measurement system for surveys on businesses

Istat Working Group for the definition of a system of indicators on respondents' burden for surveys on businesses¹

(September 2016)

1. Introduction

The present report represents an intermediate product of the Istat internal Working Group aimed at defining and implementing a system of indicators for the measurement of respondent burden for surveys on businesses.

During the second round of the peer reviews on the ESS Code of Practice, carried out in 2015, it emerged that Istat was already collecting information on response burden in some business surveys but not in a systematic and standardized way. Thus, an improvement action for the definition and implementation of a systematic and standardized burden measurement system was formulated by Istat in response to the recommendations resulting from the peer review process. The Working Group was set up at the end of 2015 with the aim of complying with such improvement action.

The purpose of this report is to describe the set of indicators on response burden that Istat is going to implement for surveys on businesses, presenting the first results obtained by testing those indicators, and reporting the plan for implementing the indicators in a systematic and standardized way.

The following section specifies some context information related to the process of modernization of production that Istat is currently undergoing. Section 3 reports some general concepts and definitions on response burden measurements and the general decisions endorsed by the Working Group on what kind of burden will be measured and how. Section 4 presents the set of indicators that the Working Group has defined in order to measure the response burden by survey and section 5 shows the preliminary results obtained from a first test run of the indicators against actual data. Section 6 is devoted to the definition of persistency indicators, i.e. measures of burden taken at business level (by business), i.e. across the whole business involvement in Istat surveys. Finally, the last section is related to the next steps to be taken, describing how Istat is going to implement the defined set of indicators.

2. The transition to the new model for business surveys

It is worth saying that Istat, in the context of the a newly established Business Architecture, is currently rearranging all the scattered resources and processes pertaining to the data collection phase under a new dedicated directorate, in a sense expanding on the principles underpinning the reorganization which the business survey system has undergone in recent years. Main goal of that reorganization was to abandon the so-called “stovepipe” model, in which each "stovepipe" identifies a specific field of statistics and its corresponding production system, and implement a new model in which the production of statistics is no longer expected to operate through independent processes, but rather as a single, consistent and integrated pool of non-redundant building blocks (enterprise-centred model).

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Cornerstone of this new system is the Istat Business Statistical Portal (2013, N.Fazio, M. Murgia, A.Nunnari) an integrated system for the management of data collection processes, which is at the same time an attempt to streamline the organization and production processes of business surveys as a whole.

The Portal acts as a single entry point for web-based data collection from enterprises, according to a “business-centric” perspective. It provides new integrated functions supporting respondents in several areas: survey unit management and updating, data collection process management, direct and proxy compilation of electronic questionnaires. The environment also provides a single software tool for developing/designing electronic questionnaires: GX (Generalised Italian (Data) Collection System XML), an in-house product using XML, to represent the main survey’s structure: survey metadata, survey variables, questionnaire structure, check plan and skipping rules.

To fully achieve his goals, this new architecture relies heavily on fast-tracking the semantic and syntactic harmonization of survey questionnaires, i.e. both in terms of concepts and design, with the perspective of improving quality and containing the respondent burden.

Up to now, surveys questionnaires were implemented with different, often dedicated/ad hoc software systems, so the migration of all of them in the Business Portal data collection system is gradually undergoing.

This emerging context of integration and common IT solutions is encouraging the definition of standards and recommended practices for questionnaire design and for all functions belonging to the data collection phase, including the sets of indicators aimed at monitoring and enhancing quality of the data collection processes.

3. The burden to be measured

The literature on the measurement of statistical burden on businesses is quite wide and a review of it can be found in the Memobust handbook (2014, Eurostat). Building on this, in order to identify indicators to be produced, it was needed to provide some details to better substantiate what was intended to be measured.

It is possible to narrow down the factors that contribute to create burden to two main classes:

- actual/objective factors, mainly due to time spent to provide responses
- subjective factors, connected with what is ‘perceived’ as burden by respondents.

The first kind of factors can be measured in terms of time, but also of costs. For this purpose, a model has been evaluated, the so called SCM - Standard Cost Model (2004, Eurostat). On balance, this wasn’t considered as a viable, cost-effective option, as SCM requires analysts to collect a broader set of information than just time spent completing the questionnaire. (2012, J.Jones).

On the other hand, the concept of time spent to provide responses needs to be specified as well, making clear what is intended to include in it. In particular, it should be decided whether considering all the following activities:

- time to understand what is being required
- time to retrieve data to be provided
- time to complete the questionnaire
- time to respond to re-contacts typically during the data editing phase.

Istat decided that **the burden each survey places on respondent businesses will be measured only in terms of: i) time to retrieve information to be provided and ii) time to completely fill in the questionnaire.** It was considered that tracking time spent on the remaining activities in the list would have been too complex and time consuming.

The identification of '*perceived burden*' is even more complex, as it could depend on a number of aspects related to the survey design, to the characteristics of the respondent and to other external factors, so that (in order to) to assess it would be necessary to gather additional data directly from the respondents.

In designing the set of indicators to measure burden, Istat sought a solution imposing two constraints:

- do not cause further burden to respondents in order to collect information on burden;
- limit internal investments to set up IT procedure to estimate burden in different surveys.

The first constraint compelled to define a set of indicators by relying on a strategy of maximum exploitation of available sources and minimal request of information from respondents.

Following the second constraint, it has been decided that **data concerning burden will be collected and processed for surveys already residing in the Portal environment or as soon as they migrate to it, so that a single generalized software procedure, based on GX, would be implemented and set up.** This way it will not be necessary to build and manage multiple ad-hoc procedures based on different data collection systems.

Besides what already mentioned, burden can be considered from two orthogonal perspectives:

1. burden by survey (BBS), i.e. the burden the single survey places on the involved businesses)
2. burden by business (BBB), i.e. the total amount of burden generated by all the surveys a business is involved in.

Istat decided to measure burden from both points of view, expressing BBS in terms of total time spent to fulfill the requested survey task, and BBB in terms of persistency.

The choice not to produce burden indicators for all business surveys until the migration to the new environment is completed, is offset by means of the persistency indicators which will allow to have an overall view of burden imposed on businesses involved both in surveys already hosted by the Portal and in those not yet migrated.

The last aspect which has to be stressed before describing the proposed indicators is that they are aimed at representing the evolution of the phenomenon of burden more than a precise estimate of a statistical entity, This is because the indicators are thought for all kind of surveys (both short term and structural), that involve different types of sample designs, final elaboration and treatment of changes that occur to the respondent units during the same year. Hence, the chosen criteria for selecting the set of businesses to be considered in each period to measure burden will not take into account a series of events (for instance events depending on the business demography, as well as late responses of businesses providing data after the given deadline) which, on the contrary, are relevant for the survey's results. This is to assure the comparability of the several surveys burden indicator to be evaluated year by year.

4 Burden indicators by survey (BBS)

As already mentioned, the burden that each survey lays on respondent businesses will be measured in terms of time to complete the questionnaire and time to retrieve information needed. In particular, burden will be considered for all the respondent businesses (businesses who submitted the filled-in questionnaire). In details:

1. **time to fill in the questionnaire** will be quantified processing the paradata the GX system automatically records: in order to measure the burden that each survey causes on respondent businesses it was decided to exploit sources of information automatically generated by the software system used for data collection (paradata) and minimize the request of data to businesses. As known, paradata are a rich informative source for monitoring the data collection process, as they store automatically all actions performed by respondents while navigating the data collection environment (1998, M. P.Couper).
2. **time to retrieve information to provide data** and other information will be asked to respondents in an ad-hoc section to be added to each surveys questionnaire as they migrate to the new GX system (the '*burden section*' is shown below).

Figure 1: the Burden section

1. Report how many people were involved in providing information:

□ □ □

2. Indicate the time you spent to retrieve the information necessary to fill in the questionnaire, selecting one of the following time classes

Please check only one answer

1	2	3	4	5	6	7
Up to 15 minutes	From 15 minutes to half an hour	More than half an hour and up to 1 hour	More than 1 hour and up to 3 hours	More than 3 hours and up to 10 hours	More than 10 hours and up to 30 hours	More than 30 hours
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The upper classes won't be presented for very short questionnaires

3. Indicate whether and which difficulties you encountered in filling in the questionnaire:

More than an answer is possible

- a) *Technical and IT problems*
- b) *Difficulties in navigating through the questionnaire sections*
- c) *Too many questions*
- d) *Insufficiently clear questions*
- e) *Unclear or not exhaustive answer options*
- f) *Not enough information supporting the understanding of questions*
- g) *Excessive distance between information requested and information available in the business*

h) *No difficulties encountered*

Not pertinent for very short questionnaires

4. Please provide any comments and/or suggestions regarding the filling in of the questionnaire:

There is a very important difference between the two sources used: paradata are exhaustive, which means they are available on all businesses who submitted the filled-in questionnaire, while data coming from the burden section of the questionnaires are partial as answering was not compulsory. On the other hand, it has been confirmed (see par. 5) that the set of businesses who fills in this section is not particularly characterized against the complete set of respondent businesses.

4.1 Time spent to fill in the questionnaire

As already mentioned, paradata will be used to estimate the time spent to fill in the questionnaire. The strength of using this source is that it is absolutely objective and precise. It allows to quantify the actual and net time each respondent dwells on each of the questionnaire sections, even if the compilation takes place in different sessions. As a matter of fact, with paradata the start and end times of each compilation session are recorded (date, hour, minute, second). By processing these timestamps, it is possible to measure the duration of each session and, in case the questionnaire has been filled during different sessions, the summed duration of all sessions represents the total actual time spent to fill in the questionnaire. As we see, this calculation is based on primary data and absolutely objective, while compilation times elicited directly from respondents could be affected by subjective evaluation and prone to perception bias.

By processing paradata it is also possible to get additional and very interesting information, for instance: the gross amount of time the respondent spent providing data (from the start date and time of the first session to the end date and time of the last session), whether the respondent provided data in one single session or in several sessions, whether he made it in a single day or across several days.

The indicator of burden will be processed for respondent businesses, namely those that submitted a completed questionnaire. This does not imply any further consideration for structural surveys (SBS), while a clarification has to be made on short term surveys (STS): only businesses who provided data for all the periods of the reference year are considered as respondents (12 months for monthly surveys, 4 quarters for quarterly surveys).

So the indicators, for SBS and STS surveys respectively, are as follows:

SBS surveys

$$(1) \quad \overline{ACT} \text{ (Average Compilation Time)} = \sum_{i=1}^n (CT) / n$$

Where

CT = compilation time of the '*i*' respondent business

i = '*i*' respondent business

n = total number of respondent businesses

STS surveys

$$(2) \overline{ACT} = \frac{\sum_{j=1}^m (\sum_{i=1}^n (CT)/n)}{m}$$

Where

CT = compilation time of the 'i' respondent business

i = 'i' respondent business

n = total number of businesses respondent for **all** the periods of the reference year (constant value for all the periods)

j = 'j' period

m = total number of periods

As it can be seen from the formulas, this indicator is a simple mean, but it provides survey managers with a starting point for further analysis, for instance to highlight whether there are significant differences depending on the businesses' characteristics (in terms of dimension or turnover or economic activity sector).

4.2 Time spent retrieving required information and number of people involved in the task

The answer given by respondents to the second question of the Burden section will be used to estimate time spent to retrieve information. This datum is surely subjective and, if the respondent perceives the task of providing data for statistical survey as a burden, it could be overestimated. On the other hand, the experience in conducting business survey clearly shows that within the 'Response process' (Edwards and Cantor, 1991; Sudman et al., 2000; Willimack and Nichols, 2001) the step of 'retrieval information' is particularly heavy for businesses because it often implies finding and analyzing data from corporate databases and/or paper filing systems. It follows that this information must absolutely be taken into account in estimating the respondent burden.

As it can be seen in Figure 1, the question in the Burden section (*...time you spent to retrieve information necessary to fill in the questionnaire...*) is structured in classes of dimension (class 1: up to 15 minutes; class 2: from 15 minutes to half an hour,....etc). An approximation of the time spent on average will be elaborated, taking the central value of each class as reference time for the final calculus. The last class will not be considered for this calculus because defining the central value would need not available information. In addition, this class is selected by a very low percentage of respondents (see par. 5)

In synthesis, it will be expressed through the following indicator:

$$(3) \overline{ART} \text{ (Average Retrieval Time)} = \sum_{i=1}^n (RT)/n$$

Where

RT = retrieval time of the '*i*' respondent business

i = '*i*' respondent business

n = total number of businesses which responded to the burden section

Another aspect was considered relevant to estimate burden: the number of people involved in providing information. It is worth considering that the fact of involving more than one person may have several explanations: providing the requested data requires different professional skills, so that different experts within the business must be contacted or, particularly for STS surveys, the person who fills the questionnaire could not be the same in all data collection periods during the year. Anyway, providing such an information can be helpful for the survey manager to conduct further analysis.

The indicator will be expressed through the following formula:

$$(3) \quad \overline{PI} \text{ (Persons Involved)} = \sum_{i=1}^n (PI) / n$$

Where

PI = persons involved in providing information

i = '*i*' respondent business

n = total number of businesses which responded to the question of the burden sections

As already said, the burden section was added to questionnaires as survey migrated to the new GX system. It must be specified that for STS surveys, it was decided to request this information to respondents only in the last period (last month or last quarter) of the collection year, to avoid redundancy, specifying to the respondent that the information asked was to be considered as the average time spent in the different periods of the collection year.

4.3 Possible burden caused by difficulties encountered in providing information

With the third question of the Burden Section (*Indicate whether and which difficulties you encountered in filling in the questionnaire*) some aspects are investigated related to other possible causes of burden pertaining to survey design: questionnaire length, questionnaire design (in terms of clarity of questions, support information, question options), usability of the electronic questionnaire (ease of navigation and functions supported), IT problems, etc. The set of response options of this question is surely not exhaustive and respondent's attitude towards collaboration is not being investigated, but this would have required a wider set of questions which in turn would have caused more burden on respondents. Certainly this question does not allow to single out the specific problem/difficulty (if the option '*unclear and not exhaustive questions*' is selected, it is not known which question it is referred to), but it can be viewed as

evidence of some problems occurring, especially in the context of surveys freshly migrated to the new IT system, or every time the questionnaire has undergone deep changes.

The indicator will be simply expressed through a table showing the frequency distribution of businesses per number of problems encountered. This information allows to monitor the evolution of the phenomenon, with the aim of reducing the percentage of respondents encountering the higher numbers of difficulties.

<i>Number of difficulties declared by the respondent</i>	<i>Number of respondent businesses</i>	<i>% of respondent businesses</i>
0		
1		
2		
3		

4.4 Summary report on burden by survey (BBS)

For each survey the defined set of indicators will be systematically calculated.

Besides the values of the indicators, some further information on the survey, on the questionnaire and on the actions undertaken to reduce the respondents' burden can be of interest for an overall assessment of the response burden by survey.

First of all, the raw² number of respondents (respondent businesses) to the survey provides an idea of the survey size and the "incidence" of the burden on the businesses population.

Secondly the raw number of respondent units is reported because the burden is measured at business level, but a business, if articulated in different units, would provide information for all of them, so knowing the number of units pertaining to a single business helps to explain the obtained value of the burden indicator.

Finally it can be interesting to know what actions have been already implemented to contain the burden, in particular if the sample was selected limiting the overlapping with other surveys.

The following figure summarizes the information to be provided/collected for each survey.

² 'Raw' meaning that businesses responding after the deadline, for example, are not considered.

Summary report on response Burden

- (1) \overline{ACT} = Average Compilation Time
- (2) \overline{ART} = Average Retrieval Time
- (3) \overline{PI} = Average number of Persons Involved in providing information
- (4) Frequency distribution of businesses per number of problems encountered

Raw Number of respondent businesses _____ Raw Number of respondent units _____

Coordination function used
in selection of sample: _____

In addition, another information can be analyzed to explain burden, even if it will not be included in the summary report because mostly relevant for internal experts: the level of complexity of the questionnaire. Istat has defined a simple indicator to measure in a standard and comparable way the complexity of its questionnaire. The indicator of complexity (CI)³ takes into account the number and type of questions included in the questionnaire, the difference between the minimum and the maximum number of answers that should be provided and the presence of routing rules. These different factors are then summarized on a qualitative scale (easy, medium, difficult). The value of the CI can be used as a support to compare the indicators on burden across different surveys: e.g. if two surveys have the same level of CI and very different values for the burden indicators the situation calls for further investigation. The difference in topics between the two surveys can, for example, justify the variation, but it is also possible that the survey with the higher level of burden would benefit from some improvements in its design to reduce it.

5. First results of burden indicators on ICT survey

Istat conducts survey on the use of information and communication technologies (ICT) on the basis of EC Regulation on Statistics on Information society involving active enterprises in industry and services with 10 or more employees. Since the year 2014 this survey has been managed through the new data collection system integrated into the Business Statistical Portal. Concurrently, major/significant innovations were introduced, regarding the overall design of the questionnaire, the way inconsistencies are highlighted in the electronic form when rules

³ The concepts considered for this index are: number of questions, scores of questions and paths to fill in the questionnaire. Different scores are assigned according to the characteristics of the questions (open-ended, closed-ended, multiple choice, etc.). The different paths of the questionnaires are analyzed in order to identify the shortest and the longest path.

Questions scores corresponding to the shortest and to the longest path are calculated.
The Index is the arithmetic average between these two scores.

violations are triggered and tools for monitoring the survey progress. Moreover, it was decided to add a new section at the end of the questionnaire to measure *respondent burden* in terms of classes of time necessary to find information (*retrieval time*) and about number of persons involved in providing the requested information.

In the rest of this section, results of the analysis on both the burden section and the compilation time are presented.

Response rate of ICT survey in 2015 was about 61%. Table 1 reports the percentage distribution of respondents who only answered the survey and respondents who gave an answer also to the burden section, showing a very good data representativeness.

Table 1 - Respondents ICT2015 and burden section by size class (absolute value and percentages)

Size class	Total	Respondent to ICT	Respondent both
		and not to burden	to ICT and burden
		percentages	
10-19	9146	0.70	99.30
20-49	3675	0.65	99.35
50-99	1982	0.50	99.50
100-249	2109	0.95	99.05
250+	2509	0.88	99.12
Total	19421	0.72	99.28

*Enterprises are considered as respondents to the burden section if they answered at least one between retrieval time and persons involved

Table 2 shows the retrieval of information time classes by size classes of enterprises. As we see, there is a clear-cut concentration of enterprises of all sizes in the first three classes of retrieval time and, moreover, it is evident that a larger amount of time was needed by companies with at least 50 persons employed (i.e. more than 60% of large enterprises needs a time between 30 minutes and 3 hours to find information). The extra time required by larger enterprises is justified by the fact that a more complex organization implies more intensive use of ICT, which results in a longer path of the questionnaire (different paths are due to the responses to the filter questions).

Table 2 - Respondents ICT2015 by retrieval time of information classes, by size class (percentages)

Size class	Retrieval of information time classes					
	Up to 30 minutes	More than half an hour and up to 1 hour	More than 1 hour and up to 3 hours	More than 3 hours and up to 10 hours	More than 10 hours and up to 30 hours	More than 30 hours
10-19	41.11	41.00	15.77	1.58	0.29	0.25
20-49	36.64	41.95	18.36	2.53	0.28	0.25
50-99	32.49	39.86	22.01	4.73	0.51	0.41
100-249	25.11	38.36	28.52	6.05	0.91	1.06
250+	15.41	35.94	34.33	10.85	1.82	1.65
Total	34.33	40.12	20.68	3.76	0.57	0.54

Missing=210

Similarly, with increasing firm size also the number of people involved in compiling increases due to the greater variety of skills required to answer questions of different topics investigated by ICT survey (Table 3). Compared with an average of about 1.7 people needed to enterprises with fewer than 20 persons employed, filling in the model takes on average 3.5 persons to the larger enterprises with almost 250 persons employed. The more general *Average number of Persons Involved in providing information* (\bar{PI}) is 2.17 persons per enterprise.

Table 3 - - Respondents ICT2015 by number of Persons Involved in providing information, by size class (percentages)

Size class	1*	2	3	4	5	6+	Average number of Persons Involved in providing information
10-19	47.40	37.64	11.66	2.25	0.65	0.41	1.73
20-49	38.79	37.30	16.65	4.44	1.94	0.87	1.98
50-99	30.46	36.46	19.04	7.15	4.49	2.40	2.30
100-249	20.15	34.04	24.67	9.98	6.20	4.96	2.71
250+	11.40	27.86	24.84	12.19	10.43	13.28	3.53
Total	36.51	35.82	16.44	5.26	3.13	2.83	2.17

Missing = 686

*In this category enterprises answered 'zero' persons involved are included.

Using central value of each time classes to retrieve information (even if the classes do not have the same width), it is possible to calculate the *Average Retrieval Time* (\overline{ART}) as reported in Table 4. Standard deviation shows high dispersion of the data around the mean.

Table 4 - Retrieval of information time (central value of the first 5 classes), by size class (\overline{ART})

Size class	missing	N	Mean (minutes)	Standard deviation
10-19	97	9026	53.29	83.19
20-49	42	3624	59.73	88.62
50-99	15	1959	74.07	114.71
100-249	26	2061	90.74	139.07
250+	30	2438	125.86	182.58
Total	210	19108	69.94	114.20

*Central values in minutes of the first 5 classes: 15, 45, 120, 390, 1200.

Paradata are also useful in measuring respondent burden in terms of time spent to complete the questionnaire, so that it is possible to calculate the *Average Compilation Time* (\overline{ACT}) (2015, Masselli et al.; 2014, Nuccitelli et al.). In Table 5 standard deviation shows high dispersion of data and an average time of about 47 minutes increasing passing from small enterprises (42 min) to large ones (65 min). Data show a certain direct relation between size classes and net time needed to complete the questionnaire.

Table 5 – Compilation time, by size class (\overline{ACT})

Size class	N	Mean (minutes)	Standard deviation
10-19	8962	41.95	50.75
20-49	3614	43.30	56.64
50-99	1952	46.47	64.40
100-249	2064	54.11	75.37
250+	2465	64.68	95.44
Total	19057	46.92	64.01

In tables 6 and 7 are presented data results from a question included in the burden section only during the first wave of the survey hosted by the new data collection system (2014). The question was about difficulties encountered by respondents in filling in the questionnaire. It was asked about *IT difficulties* caused by the new system, *conceptual difficulties* related to lack of clarity or of supporting information, *ease of data availability* and on *length* of the questionnaire. About 1 out of 2 respondents was experiencing no difficulties (49%). For all sizes of enterprise the highest difficulty was related to the length of the questionnaire (21%), also conceptual difficulties were big obstacles to fill in the questionnaire (26,5%); finally, very few indicated the importance of the difficulties encountered in the new data collection tool (9%).

Table 6 - Respondents to ICT2014 survey and to difficulties question, by size class
(absolute value and percentages)

Size class	Total	Respondent to ICT	Respondent both
		and not to difficulties	to ICT and difficulties
<i>percentages</i>			
10-19	1831	5.74	94.26
20-49	9021	6.52	93.48
50-99	3329	7.08	92.92
100-249	2308	9.56	90.44
250+	2061	10.49	89.51
Total	18550	7.00	93.00

As it is shown in Table 7, 1 enterprises out 3 indicates not more than 2 difficulties encountered in compiling the questionnaire.

Table 7 - Respondents ICT2014 by number of difficulties encountered in compiling the questionnaire, by size class (percentages)

Size class	Number of difficulties				
	0/missing	1	2	3	4+
10-19	50.13	21.44	14.75	7.87	5.81
20-49	56.32	20.04	13.25	6.58	3.81
50-99	60.80	19.21	11.89	5.77	2.33
100-249	65.05	18.79	10.54	3.39	2.24
250+	68.93	17.76	8.45	3.16	1.69
Total	56.24	20.22	12.96	6.38	4.20

Summary report on response Burden for ICT Survey year 2015

- (1) \overline{ACT} = Average Compilation Time: 46.92
- (2) \overline{ART} = Average Retrieval Time : 69.94
- (3) \overline{PI} = Average number of Persons Involved in providing information: 2.17
- (4) Frequency distribution of enterprises per number of problems encountered

<i>Number of difficulties declared by the respondent</i>	0	1	2	3	4	5	6	7
% of respondent enterprises	56.24	20.22	12.96	6.38	2.73	1.04	0.23	0.20
Number of respondent enterprises	10,432	3,751	2,405	1,183	506	192	43	38

- Number of respondent businesses used⁴: 19,421

- Coordination function used in selection of the sample: *negative coordination*

6. Burden indicators in terms of persistency (BBB)

The persistency indicators aim at measuring burden from the point of view of a single enterprise potentially involved in several Istat surveys in a given time period. The main reason

⁴ Number of respondent units is not reported as it coincides with number of respondent businesses because data are requested only for businesses.

why Istat has decided to calculate the persistency indicators is that multiple requests addressed to the same enterprise may reduce the quality of the response given.

In the last years, many National Statistical Institutes have been increasingly using sampling coordination techniques to reduce the overlap between samples of different surveys. Nevertheless, large enterprises are more likely to be selected into survey samples, causing a “persistent” burden to these statistical units. Indeed, they are often selected with probability 1 from different surveys or from the same survey in consecutive time periods. The calculation of the persistency indicators does not imply further burden on the enterprises, because it is based on information already available in Istat databases.

In the final report we will produce two groups of persistency indicators referring to planned and actual burden, respectively. The first group of indicators is based on the number of surveys a unit is selected for, while the second one considers the number of questionnaires the enterprise fills in. The indicators, to be calculated for years 2014 and 2015, are based on the following quantities:

S_1, S_2, \dots, S_n = number of enterprises selected into (exactly) 1, 2, ..., n surveys during year t

R_1, R_2, \dots, R_n = number of enterprises that have filled in (exactly) the questionnaires of 1, 2, ..., n surveys during year t .

From the quantities above we calculate the following indicators:

$$S'_k = \frac{\sum_{i=k}^n S_i}{N} \cdot 100 = \text{percentage of active enterprises selected into at least } k \text{ surveys during year } t$$

$$R'_k = \frac{\sum_{i=k}^m R_i}{N} \cdot 100 = \text{percentage of active enterprises responding to at least } k \text{ surveys during year } t,$$

where N is the total number of active enterprises according to Asia, the Italian business register⁵, n and m are the maximum number of surveys an enterprise is involved in during year t ⁶.

All the indicators of persistency are finally calculated by size classes (in terms of number of persons employed) and economic activity, exploiting the information available from Asia⁷.

7. Implementation plan and perspectives

The activities carried out in the first months of 2016 by the Istat Working Group on the measurement of burden for surveys on businesses have been focused on the definition of the set of standard indicators (and metadata) on burden to be calculated in a systematic way. Such indicators have also been tested on the ICT survey.

⁵ Calculation is based on the updated Asia from which the sampling frame has been taken.

⁶ n and m are the maximum number of surveys an enterprises involved, in the sense of planned and actual burden, respectively.

⁷ About Asia year of reference, see footnote above.

The next period will be devoted to design and develop the system to produce, store and disseminate such indicators systematically and, possibly, automatically.

First of all, by December 2016, the analysis conducted on the data from ICT survey will be replicated for the other surveys already migrated in GX, namely ‘Monthly survey on employment and labour cost in large enterprises and Industrial turnover and orders’, in order to:

- verify the applicability of the indicators also in short-term surveys;
- map and document in detail the process/procedure needed to calculate indicators, as such procedure should then be automatized;
- study how the burden indicators can be systematically stored and disseminated;
- provide the basis for the first annual report on burden that should be produced by the end of 2016 to comply with the improvement action recommended by the peer review;
- identify possible areas of improvements for reducing the burden for the surveys already migrated in the Portal architecture.

Subsequently, the software application to automatically calculate such indicators will be implemented. It will be integrated within the Istat Business Statistical Portal. Each time a new survey is migrated in the GX environment the standard Burden section will be added to the questionnaire. In addition, a generalized software procedure will automatically process both the paradata and the results obtained on the Burden section to calculate the standard burden indicators by survey (BBS).

In particular, the strategy adopted is to process paradata to build a dedicated database to be used to systematically produce the burden indicator for each survey, but also to allow survey managers to make all the analysis they could be interested in. The choice of setting up this database is due to need of modeling paradata, a noisy, inherently unstructured and highly redundant source, into a structured, non-redundant and relevant informative base.

The standard burden indicators that will be automatically produced for each survey should then be stored in the Istat official system for reference metadata and quality indicators documentation (SIDI/SIQual). In the next period the best way to store such information, also on the basis on the test conducted, will be designed and set up. The idea is to automatize also the procedure that from the Portal system will write such indicators in the SIDI/SIQual database. It is worth noting that the SIDI/SIQual system is already conceptually integrated in a similar way with the “Nuovo Pervenuto”⁸ system to derive the standard quality indicators for coverage and unit nonresponse errors of the surveys on Businesses. The “Nuovo Pervenuto” system is connected with the Portal and is the main source used to derive the persistency indicators.

In the next period the focus will be also on the identification of/ the best way to disseminate the standard burden indicators. Actually, at first, being the indicators available only for a limited set of surveys, the publication of the report, expected by the end of 2016, could be sufficient. It is deemed more relevant to design the best way to disseminate such information in a systematic and standard way when data from a larger number of surveys will be available. It should also be taken into account that another improvement action formulated in response to a recommendation

⁸ The ‘Nuovo pervenuto’ is a db built to manage the monitoring of the coverage of all the businesses surveys. The response codes used in this system are consistent with those of the system for reference metadata and quality indicators

of the peer review, to be completed by the end of 2017 is to broaden the overall offer of quality indicators disseminated on the Istat website.

Finally the Working Group will also make suggestions on how the automatically calculated and disseminated indicators should be analyzed and interpreted, in order to identify strategies for further improvement of business surveys

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