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Editorial Preface

The three scientific articles published in this issue of the *Rivista di statistica ufficiale* deal with business statistics.

In the first study, Annamaria D'urzo, Angela Golino, Stefania Macchia, Alessandra Nurra, Carmela Pascucci, Mariagrazia Rinaldi, Fabiana Rocci, Carla Schiattone and Giorgia Simeoni illustrate the commitment carried out by an internal Working Group of the Italian National Institute of Statistics – Istat.

The main purpose is to identify, process and implement a representative set of indicators and the reference methodology for measuring the respondent burden to be applied to business surveys.

An additional objective is to release them in a systematic and standardised way through a generic procedure.

The two following articles are complementary to each other and concern Large Cases Units.

The first one is written by Sonia Amante, Simone Ambroselli, Elisabetta Bilotta, Barbara Gentili, Barbara Iaconelli, Luigia Mattei, Chiara Orsini, Fabiana Sartor and Ilaria Straccamore, with the purpose of examining the way Multinational Enterprises organise their businesses worldwide and the consequent impact on the production of official statistics.

In 2016, the modernisation process started at Istat, also enhancing an *ad hoc* team to support Large Cases Units. The main results of the several analyses conducted during the first phase of this project are also documented in the present paper, evaluating size, significance and complexity aspects related to the characteristics of the national economy.

Size aspect defined according to several variables, *e.g.* gross value added, turnover, value of production or number of employees, resulted very useful for the identification of the largest Multinational Enterprises. In the meantime, complexity needs to be evaluated on the basis of other features such as the enterprise group structure and the number of activities carried out.

Finally, significance for data collection is related to the selection of the most important respondents, *i.e.* the dominant groups or those who have data provision problems.

In the closing paper of this issue, Sonia Amante, Simone Ambroselli, Elisabetta Bilotta, Barbara Gentili, Chiara Orsini and Fabiana Sartor continue to highlight the relevance of Large Cases Units both within National Institutes and for official statistics, focussing on their multidimensional meaning.

More specifically, they describe the experience of the Italian National Institute of Statistics – Istat together with the steps followed in defining the operational tasks needed to detect complex procedures involving Multinational Enterprises.

All these phases have an impact both on data quality and on international comparability.

Nadia Mignolli

Coordinator of the Editorial board

A systematic and standardised burden measurement system for surveys on businesses

Annamaria D'urzo, Angela Golino, Stefania Macchia, Alessandra Nurra, Carmela Pascucci, Mariagrazia Rinaldi, Fabiana Rocci, Carla Schiattone, Giorgia Simeoni [1]

Abstract

Following what emerged from the second round of the peer reviews on the ES Code of Practice carried out in 2015, Istat decided to propose a systematic and standardised burden measurement system, to be implemented for surveys on business through the web-based data collection.
This paper describes the study conducted to identify a representative set of indicators and the methodology to elaborate them. The results of a test run on several businesses surveys are also described and some reflections about possible strategic actions to contain burden are presented.

Keywords: Response burden, business surveys.

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The views and opinions expressed are those of the authors and do not necessarily reflect the official policy or position of the Italian National Institute of Statistics - Istat.

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1. Introduction[2]

This paper describes a study carried out by an internal Working Group[3] of the Italian National Institute of Statistics – Istat aimed at defining and implementing a system of indicators for the measurement of respondent burden for surveys on businesses.

One of the recommendations resulting from the second round of peer reviews on the implementation of the ES Code of Practice[4], underlined that Istat was already collecting information on response burden in some business surveys but not in a systematic and standardised way. Thus an improvement action for the definition and implementation of a systematic and standardised burden measurement system was formulated by Istat. The Working Group, set up at the end of 2015, had 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 has designed for surveys on businesses in a strategic perspective, so as to release them in a systematic and standardised way through a generalised software procedure. The results obtained on a first set of three surveys are presented, and some reflections about the possible strategic actions to contain burden are mentioned.

The following Section 2 specifies some context information related to the modernisation of the production process that Istat has been udergoing since 2016 (Istat, 2016). 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 on three surveys, on which the standardised process was tested according to their different features (short term / structural survey, short/long

2 Although the article is the result of a joint work, the single parts are authored as follows: Sections 1, 2, 3, and 4 by Stefania Macchia; Paragraph 5.1 by A. Nurra; Paragraph 5.2 by A. Golino and F. Rocci; Paragraph 5.3 by C. Pascucci and F. Rocci; Section 6 by M. Rinaldi and C. Schiattone; Section 7 by A. D'Urzo; Section 8 by G. Simeoni.

3 Coordinators: S. Macchia, N. R. Fazio. Members: S. Cuomo, A. Golino, R. Mazzucco, M. Murgia, A. Nuccitelli, A. Nurra, A. Nunnari, P. Papa, C. Pascucci, S. Pietropaoli, M. Rinaldi, F. Rocci, C. Schiattone, G. Simeoni.

4 For further information on the peer reviews on the ES Code of Practice please refer to http://ec.europa.eu/eurostat/web/quality/peer-reviews.

questionnaires). Section 6 describes the Automatic Procedure for Burden Indicators by Survey which implements the standardised process, while Section 7 is devoted to the percistency indicators. Finally, some preliminary suggestions to contain burden are identified.

2. The transition to the new model for business surveys

It is worth mentioning that since 2016 Istat, in the context of the newly established Business Architecture Activity Model (Istat, 2016), has been reunifying all the scattered resources and processes pertaining to the data collection phase under a new dedicated Directorate. Thus extending the principles underpinning the reorganisation which the business survey system has undergone in recent years. The main goal of that reorganisation was to abandon the so-called 'stovepipe' model, in which each 'stovepipe' identifies a specific field of statistics and its corresponding production system, to 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).

Cornerstone of this new system is the Istat Business Statistical Portal (N. Fazio, M. Murgia, A. Nunnari, 2013) an integrated system for the management of data collection processes, which is, at the same time, an attempt to streamline the organisation 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 software tool to develop/design electronic questionnaires: GX (Generalised Italian (Data) Collection System XML), an in-house product using XML, to represent the main survey's structure, *i.e.* survey metadata, survey variables, questionnaire structure, check plan and skipping rules.

To fully achieve its goals, this new architecture relies heavily on fast-tracking the semantic and syntactic harmonisation 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 measure. 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 was not 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. (2012J.Jones).

On the other hand, the concept of time spent to provide responses needs to be specified as well, making clear what it is intended to include. 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, *e.g.* 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; *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 the 'perceived burden' is even more complex as it could depend on a number of aspects, such as the survey design, the respondent's characteristics and other external factors, that might require gathering 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 as to implement and set up a generalised software procedure**.

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

- burden by survey (BBS), *i.e.* the burden the single survey places on the involved businesses;
- 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 business surveys that still are not migrated to the new environment is offset by means of the persistency indicators, which will allow to have an overall view of burden imposed on all businesses surveyed by Istat.

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 kinds of surveys (both short term and structural ones), that involve different types of sample designs and different treatments 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 indicators 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:

- **time to fill in the questionnaire** will be quantified processing the paradata[5] the data collection system automatically records, indeed it was decided to exploit sources of information automatically generated by the software system (paradata) and minimise the request of data to businesses. As known, paradata are a rich informative source for monitoring the data collection process (M.P. Couper, 1998), as they store automatically all actions performed by respondents while navigating the data collection environment;
- **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 Business Portal system (the '*Burden section*' is shown in Figure 4.1).

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 Section 5) that the set of businesses which fills in this section is not particularly characterised against the complete set of respondent businesses.

5 The paradata of a data set or survey are data about the process by which the data were collected. Example paradata topics about a survey include the times of day interviews were conducted, how long filling in the questionnaire took, whether questionnaire was completed with a single access to the system or in different times, etc. Thus there are paradata about each 'observation' in the survey. The analysis of these data are useful to asses the costs and management of a survey, so as to identify possible improvements of the questionnaire design.

Figure 4.1 - 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*
☐	☐	☐	☐	☐	☐	☐

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* ☐

Not pertinent for very short questionnaires

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*** ☐

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

Source: Istat - Study on the burden measurement system

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 connected to the web questionnaire (from the start date and time of the first session to the end date and time of the last session), whether the respondent did it in one single session or in several sessions, whether he/she 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) $\overline{ACT}$ (Average Compilation Time) = $\sum_{i=1}^{n}(CT_i)/n$

where

CT_i = compilation time, expressed in minutes, of the *'i'* respondent business

n = total number of respondent businesses

STS surveys

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

where

CT_{ij} = compilation time, expressed in minutes, of the *'i'* respondent business in the *'j'* period

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

m = total number of periods (periods of the reference year for which the respondents provided data, which means 12 months for monthly surveys, 4 quarters for quarterly surveys)

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 analysing 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 4.1, the question in the *Burden section* (*time you spent to retrieve information necessary to fill in the questionnaire*) is structured in classes (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 Section 5).

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

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

where

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

n = total number of businesses which provided this information in 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, collecting such an information can be helpful for the survey manager to conduct further analysis.

The indicator will be expressed through the following formula:

(4) $\overline{\boldsymbol{PI}}$ (Persons Involved) = $\sum_{i=1}^{n}(PI_i)/n$

Where

PI_i = number of persons involved in providing information of the *'i'* respondent business

n = total number of businesses which answered to this question in the *Burden section*

As already said, the *Burden section* was added to questionnaires as surveys migrated to the new GX system. It must be specified that for STS surveys, it was decided to request the *Burden section* only in the last period (last month or last quarter) of the collection year, specifying that the information requested was the average time spent to retrieve information to fulfill the task in the different periods of the 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 related to other possible causes of burden pertaining to survey design are investigated: 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 recently 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 higher numbers of difficulties.

Table 4.1 – Respondents

Number of difficulties declared by the respondent	*Number of respondent businesses*	*% of respondent businesses*
0		
1		
2		
3		

Source: Istat - Study on the burden measurement system

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 raw[6] 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 summarises the information to be provided/collected for each survey.

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

Figure 4.2 - Summary report

Summary report on response Burden

(1) $\overline{ACT}$ = Average Compilation Time in minutes

(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 _____

Use of sampling coordination function: _____

Source: Istat - Study on the burden measurement system

In addition, another information can be analysed 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 questionnaires. The indicator of complexity (CI)[7] 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 summarised 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 higher level of burden would benefit from some improvements in its design to reduce it.

7 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 analysed 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.

5. Results of burden indicators in ICT, LES and Turnover surveys

It is necessary to mention that those reported in this document are the first results obtained through the described methodology, which could be further assessed after a deeper analysis. In particular more insights and reflections are foreseen for short terms surveys to validate the methodologic choices defined for them through the analysis of the first year results.

5.1 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 violations are triggered and the 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 the present paragraph, 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 5.1.1 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 5.1.1 - Respondents ICT2015: *Burden section* by size class (absolute value and percentages)(a)

Size class	Total	Respondent to ICT and not to burden	Respondent both to ICT and burden
		percentages	
10-19	9,146	0.70	99.30
20-49	3,675	0.65	99.35
50-99	1,982	0.50	99.50
100-249	2,109	0.95	99.05
250+	2,509	0.88	99.12
Total	19,421	0.72	99.28

Source: Istat – ICT survey: study on the burden measurement system
(a) Enterprises are considered as respondents to the *Burden section* if they answered at least one question between retrieval time and persons involved.

Table 5.1.2 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 organisation 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 5.1.2 - Respondents ICT2015: time to retrieve information by size class (percentages)(a)

Size class	Time to retrieve information					
	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

Source: Istat – ICT survey: study on the burden measurement system
(a) 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 5.1.3). Compared with an average of about 1.7 people needed by 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* ($\overline{PI}$) is 2.17 persons per enterprise.

Table 5.1.3 - Respondents ICT2015: number of persons Involved in providing information by size class (percentages)(a)

Size class	1(b)	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

Source: Istat – ICT survey: study on the burden measurement system
(a) Missing: 686.
(b) 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 5.1.4. Standard deviation shows high dispersion of the data around the mean.

Table 5.1.4 - Average Retrieval Time by size class (a)

Size class	Missing	N	Mean *(minutes)*	Standard deviation
10-19	97	9,026	53.29	83.19
20-49	42	3,624	59.73	88.62
50-99	15	1,959	74.07	114.71
100-249	26	2,061	90.74	139.07
250+	30	2,438	125.86	182.58
Total	210	19,108	69.94	114.20

Source: Istat – ICT survey: study on the burden measurement system
(a) Central values of first 5 time classes shown in Table 5.1.2 have been used.

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 5.1.5 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 5.1.5 - Average Compilation Time in minutes by size class

Size class	N	Mean (*minutes*)	Standard deviation
10-19	8,962	41.95	50.75
20-49	3,614	43.30	56.64
50-99	1,952	46.47	64.40
100-249	2,064	54.11	75.37
250+	2,465	64.68	95.44
Total	19,057	46.92	64.01

Source: Istat – ICT survey: study on the burden measurement system

In Tables 5.1.6 and 5.1.7 are presented 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%). Later on, we tried to solve the problem of conceptual difficulties improving language used in the questions, using more effective FAQ and instruction for filling questionnaire uploaded in web site of survey and adding more tooltips in the web model.

Table 5.1.6 - Respondents to ICT2014 survey and to difficulties question, by size class (absolute value and percentages)

Size class	Total	Respondent to ICT and not to difficulties	Respondent both to ICT and difficulties
		Percentages	
10-19	1,831	5.74	94.26
20-49	9,021	6.52	93.48
50-99	3,329	7.08	92.92
100-249	2,308	9.56	90.44
250+	2,061	10.49	89.51
Total	18,550	7.00	93.00

Source: Istat - ICT survey: study on the burden measurement system

As it is shown in Table 5.1.7, 1 enterprise out of 3 indicates not more than 2 difficulties encountered in compiling the questionnaire.

Table 5.1.7 - 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

Source: Istat - ICT survey: study on the burden measurement system

In general, 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 difficulties encountered in the new data collection tool (9%) (Table 5.1.8).

Table 5.1.8 - Respondents ICT2014 by type of difficulties encountered in compiling the questionnaire, by size class (percentages)

Size class	Technical and IT problems	Difficulties in navigating through the questionnaire sections	Too many questions	Insufficiently clear questions	Unclear or not exhaustive answer options	Not enough information supporting the understanding of questions	Excessive distance between information requested and information available in the business	No difficulties encountered
10-19	9.33	1.52	23.74	22.30	11.66	17.83	14.54	44.39
20-49	8.44	1.20	20.46	17.87	9.28	13.97	11.93	49.80
50-99	7.57	0.92	18.78	13.29	8.01	10.29	11.60	53.71
100-249	5.57	1.47	17.86	10.32	7.97	7.65	9.34	55.49
250+	3.94	0.95	15.86	8.80	7.50	5.20	9.36	58.45
Total	7.94	1.32	21.04	17.64	9.95	13.72	12.59	49.24

Source: Istat - ICT survey: study on the burden measurement system

Figure 5.1 reports the summary report on response burden for ICT survey.

Figure 5.1 - Summary report for ICT survey year 2015

(1) $\overline{ACT}$ = Average Compilation Time in minutes: 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

Number of difficulties declared by the respondent	*0/missing*	*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 used[7]: *19,421*

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

**Note that for indicators 3 and 4 data from ICT year 2014 are used*

Source: Istat - ICT survey: study on the burden measurement system

5.2 First results of burden indicators on LES survey

Since the '80s of the last century, Istat has conducted the monthly survey on employment, working hours, wages and labour costs in large enterprises (LES). Starting from 2012 a section about job vacancy has been included in the questionnaire at the end of every quarter (in March, June, September and December). This survey on the *large enterprises* contributes along with other two quarterly surveys (one concerns job vacancy and hours worked – Vela, the other one concerns Employment Remuneration and Social Security Contributions – Oros) to determine indicators on the input and labour costs in all enterprises with employees. The values obtained through the integration of these three different statistical surveys are sent to Eurostat in compliance with the following European regulations:

1. STS-term statistics (no. 1165/98) and subsequent amendments and additions to the number of persons employed, hours worked and gross and salary wages.
2. Labour Cost Index (n. 450/2003).
3. Regulation on job vacancies of the European Parliament and of the Council (no. 453/2008) and on the Commission's implementing regulations (no. 1062/2008 and no. 19/2009).

The LES survey refers to enterprises with more than an average of 500 employees at the base year 2010[8]. These are about 1,250 and are monitored heavily to minimise the non-response rate, that has been registered to be about 17% for preliminary estimates and only 3.5%[9] for the final estimates released in April 2016.

It is worth reporting that, in order to renew the panel for the base year 2015, a set of 380 new enterprises started to be surveyed. As these enterprises do not contribute to the current results, they are monitored more lightly: at April 2016 the non-response rate on this set of units has been registered to be about 40%.

8 This base refers to 2015 year of survey, but it changes periodically.

9 Monthly reminders (by e-mail and fax) and intensive follow-ups by phone are addressed to not responding LES units. In 2015 once a year a warning with penalty (registered letter with return receipt) was sent to firms that had not answered to LES for two or more months.

In 2015 this survey started to be managed with the new data collection system integrated in the Business Statistical Portal and the questionnaire was developed in GX system.

As ICT survey, with the migration to the Business Statistical Portal some significant innovations were introduced. They regarded:

- number of questions: some added and others removed from previously 2014 edition;
- overall design of the questionnaire;
- the way inconsistencies are highlighted in the web form when rules violations are triggered.

Furthermore, the already mentioned *Burden section* was added in the questionnaire (section K). It's important to underline that answering to this section was not compulsory and no alerts appeared on the screen if the section was not filled.

In the following, results of the analysis on both the compilation time and the *Burden section* are presented.

As already said, response rate of LES survey in 2015 is different depending on whether the enterprises belong to panel of the base 2010 (1,250 enterprises) or to the renewed panel for new base 2015 (not already considered for published data, 380 units).

In addition, as only the subset of businesses who provided data for 12 months is considered to calculate the burden indicators (see Paragraph 4.1), the response rate for 2015 is 88% (1,422 enterprises as respondents over 1,630 enterprises in total).

The *Average Compilation Time* ($\overline{ACT}$) is almost 43 minutes, more or less the same time as standard deviation.

Table 5.2.1 - Average Compilation Time in minutes

	N	Mean (*minutes*)	Standard deviation
Total	1,422	42.6	43.7

Source: Istat - LES survey: study on the burden measurement system

The respondents to section K of questionnaire of December were 997, while the non respondent units were 362. In this case the number of units that were supposed to respond were 1,765: in fact this section is referred to each respondent unit (KAU) (Table 5.2.2).

Table 5.2.2 - Respondents LES 2015: *Burden section*

	Number of units	Respondent to LES December and not to burden	Respondent both to LES December and burden
Total	1,765	362	997

Source: Istat - LES survey: study on the burden measurement system

Table 5.2.3 shows the time to retrieve information by size classes. As we see, nearly half of respondents needed more than 1 hour and up to 3 hours, while the 31% needed more than half an hour and up to 1 hour to fill the questionnaire.

Table 5.2.3 - Respondents LES2015: time to retrieve information by size class (percentages)(a)

	Time to retrieve information				
	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
Total	12.1	31.0	44.4	12.0	0.4

Source: Istat - LES survey: study on the burden measurement system
(a) Missing: 367.

The *Average number of Persons Involved in providing information* ($\overline{PI}$) is 1,5 persons per enterprise (Table 5.2.4).

Table 5.2.4 - Respondents LES2015: number of persons Involved in providing information by size class (percentages) (a)

	1[(b)]	2	3	4	5	6+	Average number of Persons Involved in providing information
Total	64.1	24.0	9.4	2.5	0	0	1.5

Source: Istat - LES survey: study on the burden measurement system
(a) Missing: 367.
(b) In this category enterprises answered 'zero persons involved' are included.

Finally the *Average Retrieval Time* ($\overline{ART}$) is reported in Table 5.2.5. Standard deviation shows high dispersion of the data around the mean.

Table 5.2.5 - Average Retrieval Time

	Missing	N	Mean *(minutes)*	Standard deviation
Total	367	997	120.8	128.7

Source: Istat - LES survey: study on the burden measurement system

As it is shown in Table 5.2.6, less 10% of enterprises encountered 2 or more difficulties compiling the questionnaire.

Table 5.2.6 - Respondents LES 2015 by number of difficulties encountered in compiling the questionnaire (percentages)

	Number of difficulties				
	0/missing	1	2	3	4+
Total	67.03	23.27	7.56	1.69	0.44

Source: Istat - LES survey: study on the burden measurement system

The summary report on response burden for LES survey is shown in Figure 5.2.

Figure 5.2 - Summary report for LES survey year 2015

(1) $\overline{ACT}$ = Average Compilation Time in minutes: 42.6

(2) $\overline{ART}$ = Average Retrieval Time : 120.8

(3) $\overline{PI}$ = Average number of Persons Involved in providing information: 1.5

(4) Frequency distribution of enterprises per number of problems encountered

Number of difficulties declared by the respondent	*0/missing*	*1*	*2*	*3*	*4+*
% of respondent enterprises	67.03	23.27	7.56	1.69	0.44
Number of respondent enterprises	911	316	103	23	6

- Number of respondent businesses used: 1,422

- Coordination function used in selection of the sample: *Census survey*

Source: Istat - LES survey: study on the burden measurement system

5.3 First results of burden indicators on Industrial Turnover and new Orders survey

The monthly turnover index is designed to measure the performance of industrial sales over time, limited to mining and manufacturing activities. The orders index measures the dynamic of the value of new orders received by enterprises from clients each month. This second indicator is based on the information provided only by a sub-group of enterprises participating in the survey, in particular by the industrial sectors which usually work on commissioned orders.

The reporting unit for both variables is the enterprise; however, if a firm's turnover/orders refers to more than one economic activity (at three-digit level of NACE), data are collected separately for each kind of activity unit (KAU).

Turnover is defined as the total value of all the invoices issued during the month, for sales in the domestic or non-domestic market (divided into Euro and non-Euro areas), net of VAT invoiced to clients and any discounts or rebates shown in the invoice, before expenses (shipping, packaging, etc.) or other duties.

The Industrial Turnover Indices are sent to Eurostat in compliance with the European regulation no. 1165/98 on STS-term statistics and subsequent amendments and additions.

Orders include all the new orders – in term of value – received and accepted during the month. The information is disaggregated according to whether the orders come from domestic or non-domestic clients.

The survey refers to enterprises with more than 20 employees[10], the sample is selected from the Statistical Business Register with a cut off criteria[11], the index is a fixed index with 2010 as base year[12]. The sample consists of about 8,900 companies that are monitored carefully to ensure a low rate of non response, that was near to 10% for preliminary monthly estimates and 4%[13] for the final estimates released in November.

10 For particular sectors characterised by small enterprises the size could be lower.

11 The sample is extracted to cover for all sectors -defined at 3 digit level of NACE - more or less the 70% in terms of turnover of each sector.

12 See note n.6

13 Monthly reminders by e-mail and intensive follow-ups by phone are made to non-respondent units. A legal annual warning (with a financial penalty) is sent to firms that didn't answered for at least two months in a year.

At the beginning of 2016, a set of 2,000 enterprises has been added to the sample to prepare the next rebasing (base year=2015); as these enterprises are 'new' and not very skilled with the survey, the rate of non response of this particular subset of enterprises was higher[14].

In 2015 the survey was redesigned as a Computer Assisted Web Interviewing (CAWI) survey and the questionnaire is available through the new data collection system integrated into the Business Statistical Portal (GX).

As for the other two surveys previously analysed, with the introduction of the Business Statistical Portal some significant innovations were introduced:

- reduction of number of questions: the split of foreign orders into euro and non-euro area was removed;
- introduction of some automatic checks to highlight inconsistencies during the filling of the electronic form.

Also the turnover questionnaire has a new section to measure *respondent burden*. The filling of this section was not mandatory for the 2015 and no alert appeared if the section was not filled.

In the following, the results of the analysis on the compilation time and on the *Burden section* are presented.

As seen previously, survey's response rate in 2015 is different according to the different purposes of the analysis: if the enterprises belong to the sample referred to the 2010 base (6,500 enterprises) or to the new set of enterprises extracted for the 2015 rebasing and not already considered in the calculation of the index currently disseminated.

In addition, as only the subset of businesses which provided data for 12 months is considered to calculate the burden indicators (see Paragraph 4.1), the response rate for 2015 is 90% (6,252 respondents out of 6,928 sampling enterprises).

The *Average Compilation Time* ($\overline{ACT}$) is equal to 5.4 minutes, the standard deviation to 6.2.

14 These enterprises don't contribute to the index calculation before the introduction of 2015 as base year.

Table 5.3.1 - Compilation time in minutes - $\overline{ACT}$

	N	Mean *(minutes)*	Standard deviation
Total	6,252	5.4	6.2

Source: Istat - Turnover and new Orders survey: study on the burden measurement system

The respondents to the *Burden section* in December were 1,468, while the non respondent units were 5,059. In this case the number of units that were supposed to respond were 6,527 because this section is referred to each respondent unit (KAU) (Table 5.3.2).

Table 5.3.2 - Respondents Turnover 2015: *Burden section*

	Number of units	Respondent to LES December and not to burden	Respondent both to LES December and burden
Total	6,527	5,059	1,468

Source: Istat - Turnover and new Orders survey: study on the burden measurement system

Table 5.3.3 shows the time to retrieve information by size classes; the 66.8% of respondents needs less than half an hour, while the 24.5% needs more than half an hour but less than 1 hour.

Table 5.3.3 - Respondents Turnover 2015: time to retrieve information by size class (percentages)(a)

	Time to retrieve information		
	Up to 30 minutes	More than half an hour and up to 1 hour	More than 1 hour
Total	66.8	24.5	8.8

Source: Istat - Turnover and new Orders survey: study on the burden measurement system
(a) Missing=5,059.

The *Average number of Persons Involved in providing information* ($\overline{PI}$) is 1.3 persons per enterprise (Table 5.3.4), the 95.5% of enterprises involving a single person in filling in the questionnaire.

Table 5.3.4 - Respondents Turnover 2015: number of persons Involved in providing information (percentages)

	1[(b)]	2	3	4	5	6+	Average number of Persons Involved in providing information
Total	95.5	3.8	0.6	0.1	0	0	1.3

Source: Istat - Turnover and new Orders survey: study on the burden measurement system
(a) Missing: 5,059.
(b) In this category enterprises answered 'zero persons involved' are included.

Finally the *Average Retrieval Time* ($\overline{ART}$) is reported in Table 5.3.5. Standard deviation shows very low dispersion of the data around the mean.

Table 5.3.5 - Time to retrieve information (a)

	Missing	N	Mean *(minutes)*	Standard deviation
Total	5,059	1,468	31.6	30.25

Source: Istat - Turnover and new Orders survey: study on the burden measurement system
(a)Central values of time classes shown in Table 1 have been used.

As it is shown in Table 5.3.6, 1 less than 2% of enterprises encountered 2 or more difficulties compiling the questionnaire.

Table 5.3.6 - Respondents Turnover survey by number of difficulties encountered in compiling the questionnaire (percentages)

	Number of difficulties				
	0/missing	1	2	3	4+
Total	81.85	19.27	0.31	0.05	0.05

Source: Istat - Turnover and new Orders survey: study on the burden measurement system

The summary report on response burden for Turnover survey is shown below.

Figure 5.3 - Summary report for Turnover survey year 2015

(1) $\overline{ACT}$ = Average Compilation Time in minutes: 5.4

(2) $\overline{ART}$ = Average Retrieval Time : 31.6

(3) $\overline{PI}$ = Average number of Persons Involved in providing information: 1.3

(4) Frequency distribution of enterprises per number of problems encountered

Number of difficulties declared by the respondent	*0/missing*	*1*	*2*	*3*	*4+*
% of respondent enterprises	81.85	19.27	0.31	0.05	0.05
Number of respondent enterprises	5,343	1,258	20	3	3

- Number of respondent businesses used: 6,252

- Coordination function used in selection of the sample: *the sample is selected through cut-off criterion*

Source: Istat - Turnover and new Orders survey: study on the burden measurement system

6. Automatic Procedure for Burden Indicators by Survey (BBS)

A generalised software application for the production of the indicators described in the previous section has been implemented.

This procedure runs for all the surveys in the Business Portal architecture, using the GX software for the electronic questionnaire (the possibility of expanding it also for questionnaires developed with other software systems is under study).

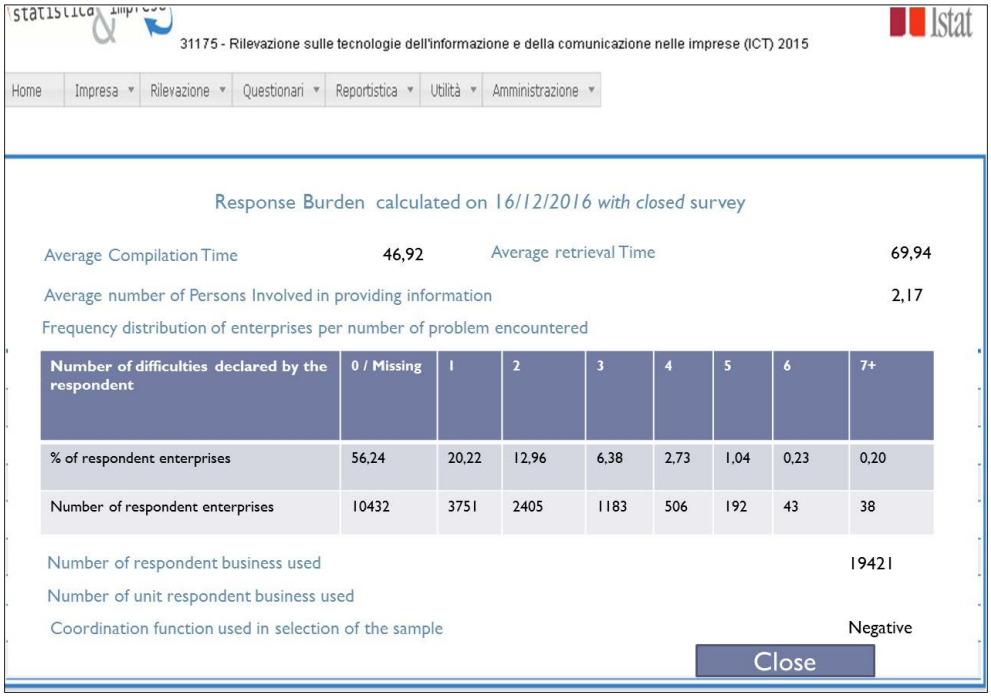
In practice, each time a new survey starts, the responsible of the survey will define:

- the type of the *Burden section* to be used for his survey: as described in Section 4, the general structure of this section is customised according the characteristics of the survey questionnaires (short, medium or long);
- the use of sampling coordination function;
- the reference of RDBMS where the *Burden section* microdata are stored;
- the year of reference of SBR ASIA archive to retrieve information regarding size class of employees or Economic Activity sector of the businesses.

Further information to be provided by the responsible of the survey is the starting and ending date of the survey to be considered, in order to select the corresponding paradata to be stored in the RDBMS.

In the Business Statistical Portal Section 'Online Report', the procedure provides a new report to be selected in the list of those which can be generated: Summary report on response burden.

Figure 6.1 - Response burden report for the ICT survey



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Response Burden calculated on *16/12/2016 with closed* survey

Average Compilation Time 46,92 Average retrieval Time 69,94

Average number of Persons Involved in providing information 2,17

Frequency distribution of enterprises per number of problem encountered

Number of difficulties declared by the respondent	0 / Missing	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	10432	3751	2405	1183	506	192	43	38

Number of respondent business used 19421

Number of unit respondent business used

Coordination function used in selection of the sample Negative

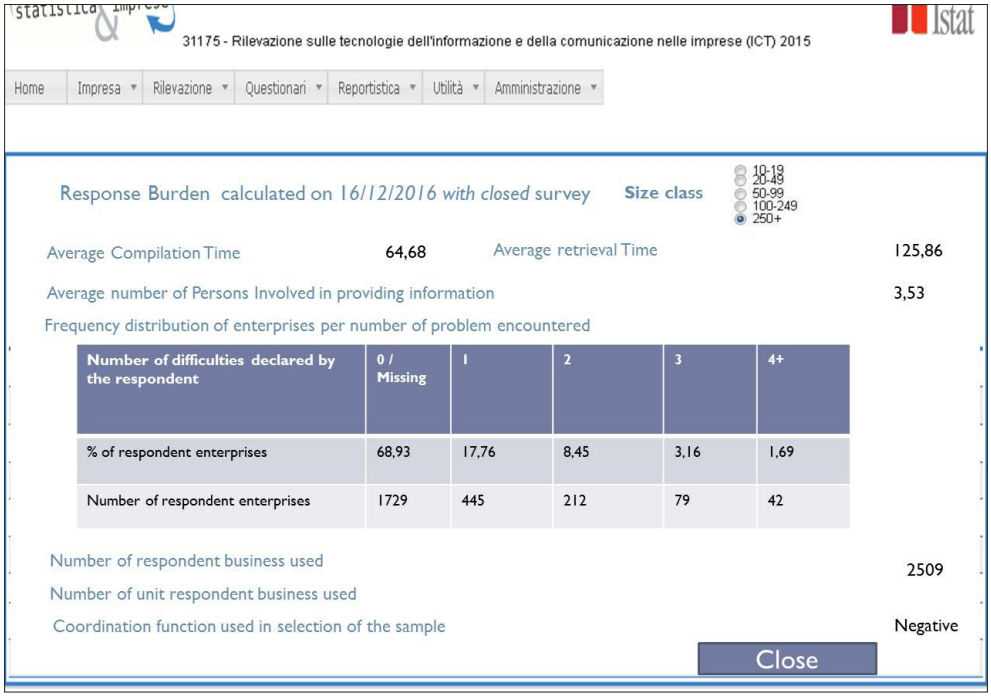
Close

The number of columns regarding 'Number of difficulties declared by the respondent' will be different depending of the type of the *Burden section*.

During the data collection phase, the person in charge can run the reports and the software application processes both the paradata and the results obtained on the *Burden section* to generate the standard burden indicators by survey. However, the results will be stored in RDBMS only when the survey is definitively closed (the person in charge will close the calculation with the appropriate button).

The report produces also results by size class of employees, using the information already stored.

Figure 6.2 - Response burden report for the ICT survey, by size class of employees



7. 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 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.

In this report we produce two groups of persistency indicators referring to planned and actual burden for year 2015. 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 calculation of the persistency indicators does not imply further burden on the enterprises, because it is based on information already available in Istat databases.

The indicators we present in this report are based on the following quantities:

S1, S2, ... , Sn = number of enterprises selected into (exactly) 1, 2, … , *n* surveys during year *t*

R1, R2, ... , Rn = number of enterprises that have filled in (exactly) the questionnaires of 1, 2, … , *n* surveys during year *t*.

From the quantities above we have calculated the following indicators:

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

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

where N is the total number of active enterprises according to Asia, the Italian Statistical Business Register (SBR)[15], n and M are the maximum number of surveys an enterprise is involved in during year t[16].

Table 7.1 - Enterprises selected into at least *k* surveys during year 2015

Number of surveys (k)	1	2	3	4	5	6	7
% active enterprises selected into k surveys	4.96	1.20	0.56	0.21	0.32	0.14	0.09

Source: Istat - Study on the burden measurement system

Table 7.2 - Enterprises responding to at least *k* surveys during year 2015

Number of surveys (k)	1	2	3	4	5	6	7
% active enterprises responding to k surveys	2.37	0.66	0.32	0.19	0.12	0.08	0.05

Source: Istat - Study on the burden measurement system

The indicators of persistency have been finally calculated by size classes (in terms of number of persons employed) and economic activity, exploiting the information available from the SBR Asia[17].

Table 7.3 - Enterprises selected into surveys during year 2015, by size classes

Size classes	0 - 9	10 - 19	20 - 49	50 -249	≥250	Total
% active enterprises selected into surveys	2.49	42.77	67.34	93.33	100	4.960

Source: Istat - Study on the burden measurement system

Table 7.4 - Enterprises responding into surveys during year 2015, by size classes

Size classes	0 - 9	10 - 19	20 - 49	50 -249	≥250	Total
% active enterprises responding to surveys	0.82	22.31	43.43	72.67	96.07	2.37

Source: Istat - Study on the burden measurement system

15 Calculation is based on the updated SBR Asia from which the sampling frame has been taken (2013).

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

17 About SBR Asia year of reference, see footnote above.

Table 7.3 shows that the share of enterprises that are selected into several surveys rapidly increases with the number of persons employed. In particular, it emerged that 2.5% of microenterprises (<10 persons employed) are involved in surveys, while this percentage grows to 49.5% for small enterprises (10-49 p. e.) and 94.5% for medium and large enterprises (≥50 p. e.). The share is 100% for large enterprises (≥250 p. e.) because in most Istat business surveys they are enumerated. We can also observe from Table 7.4 that unit response rate of larger enterprises is very high.

Table 7.5 - Enterprises selected into surveys during year 2015, by economic activity

Economic activity	Industry	Construction	Services	Total
% active enterprises selected into surveys	15.30	3.36	3.86	4.96

Source: Istat - Study on the burden measurement system

Table 7.6 - Enterprises responding to surveys during year 2015, by economic activity

Economic activity	Industry	Construction	Services	Total
% active enterprises responding to surveys	8.29	1.54	1.74	2.37

Source: Istat - Study on the burden measurement system

Tables 7.5 and 7.6 finally show that Industry has the largest share of enterprises selected and responding to Istat surveys.

8. Conclusions and perspectives

The activities carried out in 2016 by the Istat Working Group on the measurement of burden for surveys on businesses have been focussed on the development and testing of a set of standard indicators (and metadata) on burden to be calculated in a systematic way.

So far, the indicators 'by survey' have been tested on three business surveys with different characteristics ('ICT survey', 'Monthly survey on employment and labour cost in large enterprises' and 'Industrial turnover and orders') and the results are reported in Section 5.

The test has been useful not only to assess the proposed indicators, but also to define the requirements for the software application that should automatically calculate them. The proposed strategy is to add a standard *Burden section* to all surveys that migrate to the business portal IT environment, so as to implement a generalised software application that process both the paradata and the responses collected in the *Burden section* and calculate the standard burden indicators by survey (BBS). An example of this procedure has already been implemented for the GX data collection system, as reported in Section 6.

In perspective, it is planned that the burden indicators by survey will be stored in the Istat official system for the documentation of reference metadata and quality indicators, named SIDI/SIQual. This database should automatically be updated with these indicators in order to disseminate them to users through their integration into the National Quality Reports[18] that are produced through SIDI/SIQual and disseminated on the website starting from June 2018. These enhancements are still in progress as SIDI/SIQual system is also starting to be redesigned.

Furthermore, the Working group tested the Burden indicators in terms of persistency for year 2015 and the results are reported in Section 7. A software procedure should be developed to calculate annually and automatically also this set of indicators. In this case the source to derive the indicators will be the db built to manage the outcome of data collection of all the businesses surveys.

18 "Schede standard di qualità" in Italian are available at: https://www.istat.it/it/metodi-e-strumenti/strumenti-per-la-qualit%C3%A0/schede-standard-di-qualit%C3%A0.

The last task of the Working Group on the measurement of burden for surveys on businesses was to make suggestions on the indicators interpretation in order to identify strategies for reducing the burden and hopefully improving the quality of data produced by the surveys.

From the test carried out, it resulted quite clear that the specific expertise of the survey managers is necessary to interpret the indicators and identify the possible areas of improvement. The survey managers also know, for example, if there are alternative sources (*e.g.* administrative data, 'big data', web scraping, etc.) that can be exploited to reduce the burden. For example, following this study on the ICT survey, some reflections were made about the need to reduce respond burden not only acting more on development of the questions and of their explanation inside the questionnaire, but also trying to experiment other data source to have information similar to collected ones by survey. In fact in year 2017 web scraping and machine learning techniques were used to produce alternative experimental estimates on three variables collected by ICT survey (enterprises offering in their web sites web ordering, job application functionality and link to social media).

However, often the implementation of improvement actions implies the involvement and coordination of different surveys. This is the case, obviously, of the application of negative coordination of samples among different surveys in order to reduce the burden in terms of persistency.

Another example is the reduction of redundancies in information asked on different surveys: with the introduction of the Istat Business Statistical Portal the demographic information on the enterprises are now managed and updated directly by the Portal and not asked separately by all the surveys[19], other information could be managed in the same way.

It is also well known that the 'subjective' burden can be reduced improving the data collection tool. Some examples of functionalities that are deemed useful and are not implemented at the moment are the possibility to print the draft version of the questionnaire, or the consultation of questionnaires of previous editions.

19 In the Business Portal environment, each respondent, before filling in a survey questionnaire, can check and update, if necessary, enterprise' stored demographic data. In this way, this information is available for all the surveys where enterprise is involved in.

Another functionality which could be improved in the Business Portal concerns the feedback of statistical data to the businesses. In particular, relevant data for the business are going to be provided together with some functionalities connected to them, like the elaboration of 'Graphical presentation' according to the business features (economic sector, dimension and territorial location).

In conclusion, this work has to be analysed taking into account the transitional period during which it has been implemented. Major changes occurred to the organisational architecture of the Institute, so that implementation of such a system of indicators and the proposal for a full dissemination should be tailored to the new scenario. Nevertheless, the underlying concepts, both from a methodological and IT points of view, have been defined according to the generalised criteria as requested from the modernisation process all the NSI are going through.

Hence the proposed system can represent anyway a milestone and the cost for its adaptation so as to use it systematically should be low enough.

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Handling Multinational Enterprises: Istat's early experience in Large Cases Unit

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Abstract

The way Multinational Enterprises (MNEs) organise and reorganise their businesses worldwide has an impact on the production of the official statistics. During 2016, a dedicated team specifically devoted to large and complex units was established within the Directorate for Economic Statistics of the Italian National Institute of Statistics - Istat aiming at identifying the effects of complex restructuring at the early stages of the statistical production process. The main objective of this paper is describing the results of several analyses the Large Cases Unit (LCU) Team has conducted during the first phase of the project in evaluating size, significance and complexity aspects according to both the characteristics of national economy and the internal organisation of Istat.

Keywords: Multinational Enterprises (MNEs), Large Cases Unit (LCU), official statistics, globalisation.

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1. Introduction[2]

The way Multinational Enterprise Groups (from hereon will be referred to as MNEs) organise and reorganise their businesses worldwide has an impact on the production of the official statistics. Complex restructuring may affect single legal entities belonging to the MNEs, every kind of statistical unit used in the statistical production processes, all the National Statistics domains and the International comparability. For official statistics, globalisation is "one of the largest 'statistical measurement' challenges facing producers of economic statistics today" (Hussain *et al.*, 2019: 44). In fact, according to Sturgeon (2013), globalisation is a cross-border process for which an integrated and international standard approach mainly based on a better use of existing data is essential for handling the issue.

The Italian National Institute of Statistics - Istat during the last ten years has been involved in several international activities in order to manage the implications deriving from globalisation, such as the EuroGroup Register (EGR)[3], International profiling activities[4], Early Warning System, Gross National Income (GNI) MNE Pilot, Foreign Affiliates Statistics (FATS), International Sources statistics, and various projects aimed at improving the quality of National Accounts, concerning both input and output data. Eurostat has played a central role both in the research of a standard approach and in sharing common tools and practices, but also other international institutions have been increasingly interested in developing new ways to afford the problem in an international perspective. The United Nations Economic Commission for Europe (UNECE), Eurostat and the Organisation for Economic Co-operation and Development (OECD) have published in 2011 a guide on the Impact

2 Although the article is the result of a joint work, the single parts are authored as follows: Sections 1, 2, 3, and 6 by Simone Ambroselli; Paragraph 4.1 by Barbara Gentili; Paragraph 4.2 by Fabiana Sartor; Paragraph 4.3 by Barbara Iaconelli; Paragraph 4.4 by Ilaria Straccamore; Paragraph 4.5 by Luigia Mattei; Paragraph 4.6 by Sonia Amante; Paragraph 5.1 by Chiara Orsini; Paragraph 5.2 by Elisabetta Bilotta.
Proofreading by Fabiana Sartor.

3 EuroGroups Register (EGR) is the statistical business register of multinational enterprise groups having at least one legal unit in the territory of the EU or EFTA countries.
https://ec.europa.eu/eurostat/web/structural-business-statistics/structural-business-statistics/eurogroups-register

4 UNECE, Guidelines on Statistical Business Registers (2015): "6.111 Profiling is the practice of using company accounts, often accompanied by interviews with senior enterprise officials, to build and define the structure of enterprises, mainly those involved in large complex enterprise groups. The resulting profiles are used to produce a reporting structure appropriate for the surveys conducted by the NSI. Profiling usually involves establishing contact with the enterprise being profiled to develop a good understanding of its structure. It is possible, however, to complete smaller profiles simply using published accounts".

of Globalisation on National Accounts (UNECE, 2011). OECD globalisation indicators were produced in 2005 and 2010 while UNECE produced a Guide to Measuring Global Production in 2015 (UNECE, 2015a).

However, contributions have been generally referred to single statistical domains and mainly devoted to measure *ex post* the impact of MNEs operations according to a national perspective. For example, the profiling technique has been mainly focussed on establishing the appropriate statistical units (Eurostat Business Register Recommendation Manual, BRRM 2010) rather than assessing economic variables measurement. Therefore, taking advantage of the experience of some pioneering countries, such as Ireland, the Netherlands, Sweden, Finland (UNECE, 2011), and Canada (Statistics Canada, 2018), the idea of setting up in the organisational chart such specific units inside dedicated to the largest and complex MNEs, alongside other activities, has started to be considered also in different contexts.

Aiming at identifying the effects of MNEs' complex restructuring at the early stages of the statistical production process, the Istat Modernisation Programme in 2016 established within the Directorate for Economic Statistics (DCSE)[5] a Large Cases Unit (LCU) Team responsible to deal with the inconsistencies of the largest MNEs operating in Italy. Therefore, the main ambition of the team is to keep the statistical domains experts informed by adopting an *ex ante* approach applied to a National Statistical Organisation (NSO) level.

The main objective of this paper is describing the results of several analyses the LCU team has conducted during the first phase of the project in evaluating size, significance and complexity aspects (UNECE, 2015a) according to both the characteristics of the national economy and the internal organisation of Istat. Size aspect defined according to one or more variables, such as gross value added, turnover, value of production or number of employees, helps in identifying largest MNEs. Since larger does not necessarily mean complex, the complexity aspect needs to be evaluated according to other features such as the enterprise group structure or the number of activities carried out by the MNE. Finally, significance for data collection is related to the selection of the most important respondents, the dominant groups or the respondents who

5 Official name in Italian *"Coordinamento delle unità economiche complesse"* (Coordination of complex economic units).

have problems in data provision. Therefore, the work is fully embedded in the context of official statistics studies and, in particular, it shows the process and rationale of the Italian experience in setting up an LCU team.

Several analyses were conducted investigating two basic concepts: the contribution to the National statistics of the MNEs in the target population (large and complex MNEs) that combines size and significance aspects, and complexity, proxied by the multi-business concept and business groups restructuring signals. In addition, conceptual external inputs from Eurostat and other international organisations were considered to improve the international perspective.

In terms of contributions, at first the paper had a practical implication: findings helped in defining the daily activities to be carried out by the Italian LCU team. However, findings also added new insights and suggestions to the international debate on LCUs or similar activities sharing our national experience in the first phase of the project.

The paper is organised as follows. Section Two is intended to review the most significant literature, the international manuals and reports on different statistical domains and the countries best practices related to MNEs and LCU or similar activities. Basic concepts under investigation during the early stage of the project are discussed in Section Three, while Section Four presents the preliminary studies results. Interesting international initiatives for our purposes are shown in Section Five. Conclusions, limits and possible future research developments are presented in Section Six.

2. Background and context

UNECE, 2011 guide represents the main output of the Expert Group on the Impact of Globalization on National Accounts established in 2007 to review and present proposals for dealing with the main problems in the compilation of national accounts and related source statistics due to globalisation. For the purposes of this paper, the guide contains *in nuce* two important elements that became crucial in the following years. First of all, the latter reference to the 'related source statistics' clarifies that the treatment of globalisation related issues posed by the MNEs is a process that has to start at the beginning – the business register and related statistics. A coordinated approach is almost essential and efficient in handling large and complex MNEs. Secondly, the Guide illustrates the experience of four countries, Ireland, the Netherlands, Finland and Sweden, in dealing with measurement issues and statistical units definition problems (van Delden *et al.*, 2018) associated with the global nature of the MNEs. In these cases, NSOs have adopted an organisational solution by establishing dedicated units, named at that time as 'consistency units' and which will be later generally identified as LCUs, regarded as "essential for ensuring that the data of large corporations are incorporated coherently across economic statistics" (UNECE, 2015a: 87).

Generally, these teams/units are composed by experts with different skills adopting a micro-data approach. As part of the overall objective of addressing globalisation problems caused by MNEs, the approaches contain some useful differences to explain the multi-faceted issue of concerning coherence. Countries' specific aims, such as ensuring the coherence and plausibility in compiling national accounts and related statistics (Ireland), identifying inconsistencies at an early stage of statistical production to resolve them and to prevent their recurrence (the Netherlands), asking the right questions to the MNEs (Sweden), comparing monthly, quarterly and annual data within and across areas of statistics (Finland), helped us in defining our approach.

The need for this organisational solution firstly emerged in countries very dependent on international trade and investments or in which very few business groups cover a large proportion of the national economy. According to UNECE, 2011, top ten foreign-owned MNEs in Ireland covered 34 per cent of all exports of goods and service, while top 50 companies in Finland account for about 30 per cent of turnover. Furthermore, top 320 enterprise groups in

the Netherlands cover 40 per cent of turnover and 35 per cent of gross value added (UNECE, 2015a). Other interesting examples of LCU activities outside Europe include the Enterprise Portfolio Management (EPM) programme, responsible for managing all aspects of ongoing relations with Canada's 300 largest and most complex businesses that started in 2006. In their experience, 99 per cent of the entities recorded in their Statistical Business Register are referred to as 'simple' (one operating entity, one industry, and located in one geographic region), however the remaining one per cent of businesses labelled as 'complex' account for approximately 52 per cent of the total economic activity in Canada (Statistics Canada, 2018).

Concerning organisational aspects, Chapter 6 of the Guide to Measuring Global Production (UNECE, 2015a) focussed on presenting the outcomes of a survey carried out in March 2013 by the Task Force on Global Production to get a better understanding of the organisation of work and the type of analysis carried out by LCUs. The results showed as criteria for identifying large and complex entities generally comprise the following aspects: size, complexity and significance, in terms of selecting the most important respondents. Furthermore, concerning the organisation of the activities, despite NSOs have generally set up independent units, there are also teams of experts (Finland) and mixed forms (New Zealand). Such kind of units have been variously located: business statistics (Hungary); business statistics that also include national accounts (Canada, France and the Netherlands)); national accounts (Ireland), and data collection (Finland and Sweden) (UNECE, 2015a). Finally, LCU attributions vary greatly among different experiences including activities such as monitoring to identify current and forthcoming problems in data provision, data analysis, profiling, coordination, and contacts with large respondents. Despite the location of LCU (or similar) being recommended to be placed near the start of the process, maybe sitting alongside the statistical business register, the most important aspect to consider is the variety of skill set required to undertake the work.

However, the acceleration of the international debate on LCUs and similar type of activities occurred following the so-called 'Irish case'. In July 2016, the Irish NSO communicated for National Accounts for 2015 an annual increase in GDP of 26.3 per cent (CSO, press release, 2016) reporting a scale

of increase that was unprecedented in OECD economies historically[6]. As commented in the press release, in that case, globalisation exposed all its pervasive effects on official statistics showing as Gross Domestic Product (GDP) and Gross National Income (GNI, previously GNP) do not always help to understand what is happening in a single economy. As stated by Stapel-Weber and Verrinder (2016), "This is the first time — despite long conceptual discussions — that statisticians have been prompted by real economic events to take globalisation as seriously as it has to be taken, with major impacts for all kinds of economic statistics (national accounts, balance of payments, business, employment and trade). What makes the case very relevant for Europe, and the work of Eurostat, is that this could happen again any time as huge multinationals move their business around Europe and the globe".

In the light of these premises, a dedicated team devoted to large and complex MNEs operating in Italy was introduced in Istat during 2016 according to the reorganisation programme. Identifying the inconsistencies or changes required at the earliest possible stage of the statistical production process and sharing all the issues related to the MNEs investigated have been identified as the main objectives of the LCU Team. The activities of the team, partly ascribable to the LCU typology, has been included in the official mandate of the Directorate for Economic Statistics. Co-operating and collaborating with other Directorates, such as National Accounts to obtain a common and coherent treatment for specific and complex cases, and Data Collection to evaluate the degree of cooperation of the main units, have also been considered as key elements to the process.

According to the internal organisational guidelines, members of the LCU Team have been engaged part-time in the work and selected on the basis of different experiences in order to ensure both an appropriate mix of skills and an extensive network across different divisions. Heads of business primary statistics divisions have been consulted to identify staff to be involved. In particular, the team has been made up of experts of National Statistical Business Registers (nSBR), Structural Business Statistics (SBS), Short Term Statistics (STS), Foreign Affiliates Statistics (FATS) and Foreign Trade statistics. Therefore, experts from all the statistical domains within the Directorate

6 Central Statistics Office.
https://www.cso.ie/en/media/csoie/newsevents/documents/IrelandEconomicGrowthFigures.pdf

for Economic Statistics have been included in the team. Concerning the resources, team members have been involved from a minimum of five per cent to a maximum of 70 per cent of their working time and, during these years, the average number of different experts in the network has been 15 while the maximum has been 23. Finally, no additional budget and funds have been used.

3. Methods

During the first phase of the project, the LCU Team conducted several studies for evaluating what large and complex could mean in our context. According to Task Force on Global Production survey results (UNECE, 2015a; see previous Section), population of large and complex enterprises are generally identified by the following aspects: size, complexity and significance. The size of a MNE could be measured by several variables, such as gross value added, turnover, value of production and number of employees. Complexity could be assessed by the number of legal units (or enterprises) in the group or the number of layers in the structure of the enterprise group. Furthermore, complexity could be evaluated in terms of operations by industry or geographical area. Finally, significance for data collection could be achieved by selecting the most important respondents, the dominant groups or the respondents who have problems in data provision.

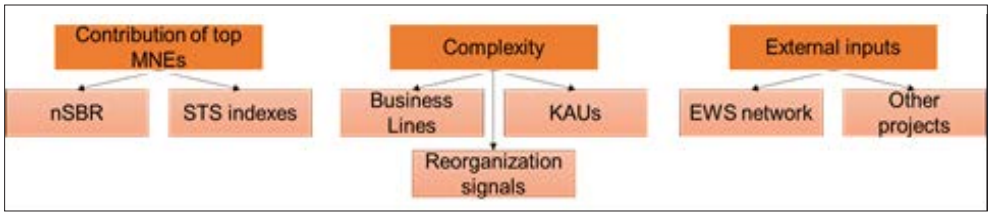
Based on these three criteria – size, complexity and significance – the LCU Team defined the number of top MNEs in the target population (from hereon will be referred to as 'target'), that is the list of the largest and complex MNEs acting in Italy, and investigated two basic concepts:

i) the contribution of top MNEs to the National statistics, that combines size, useful to define the target, and significance, an important aspect in understanding the impact of groups under analysis on business surveys.

ii) the complexity proxied by the multi-business concept and by restructuring signals from business groups.

Figure 3.1 shows all items evaluated by the team for each topic.

Figure 3.1 - Basic concepts and methods



Source: Authors' elaboration

Concerning the first item, nSBR[7] and National Statistical Business Register on Enterprise Groups[8] were examined to develop a provisional procedure to select top business groups operating in Italy to be included in the target list. Therefore, the size topic was investigated through the evaluation of the impact on statistical business registers. Furthermore, an analysis of the actual role of large business groups from a register-based perspective was made (Paragraph 4.1). In addition, the LCU Team conducted studies to verify the contribution and the degree of cooperation of top business groups on short-term surveys. These analyses helped in defining the actual role of large business groups in the composition of two short-term economic indicators, the monthly retail trade index (Paragraph 4.2), and the services turnover index (Paragraph 4.3).

Regarding complexity, we chose to emphasise economic aspects and breaking events rather than other elements, such as the number of layers in the structure of the enterprise group and complexity in terms of geographical area. Nevertheless, those latter aspects are currently captured by other Istat teams devoted to profiling and EuroGroup (EGR) activities.

The LCU Team firstly focussed on the concept of multi-business activities. In order to evaluate the presence of the kind of activity units (KAUs) for top enterprises (Paragraph 4.4), a qualitative study was conducted to analyse signals deriving from the SBS Total Survey on large enterprises (SCI)[9] and financial statements (administrative data). According to the Council Regulation (EEC) No 696/93 on the statistical units, a KAU groups all the parts of an enterprise contributing to the performance of an activity at class level (four digits) of NACE classification and corresponds to one or more operational subdivisions of the enterprise. Furthermore, within the framework of 2011 Business Census, a dedicated survey on top Italian enterprises (or enterprise groups)[10] (MPSUC) was launched to collect information on their organisation and the LCU Team investigated the results concerning the number of different business lines carried out (Paragraph 4.5). The concept of business line considered for this survey derives from the international accounting standard IRFS 8 concerning the disclosure of the operating segments in the financial statements. An operating segment is defined as a component of an

7 https://www.istat.it/it/archivio/216767
8 https://www.istat.it/it/archivio/234313
9 https://www.istat.it/it/archivio/13635
10 https://www.istat.it/en/archivio/187836

entity (enterprise or enterprise group) that "engages in business activities from which it may earn revenues and incur expenses (including revenues and expenses relating to transactions with other components of the same entity); whose operating results are reviewed regularly by the entity's chief operating decision maker; for which discrete financial information is available" (IFRS 8:2).

Restructuring events inside the target groups were considered as another way to proxy the complexity inside MNEs (Paragraph 4.6). The LCU Team defined different streams of monitoring activities to share signals concerning complex reorganisations able to affect the statistical production.

Conceptual external inputs from Eurostat and other international organisations were considered to refine the definition of the tasks also according to an international perspective. Cross-countries impact of MNEs activities requires the development of international networks able to guarantee information and coordination, such as the Eurostat Early Warning Signal network (Paragraph 5.1). As international aspects tend to be very demanding, The LCU Team has started following the news concerning these topics trying to define dedicated tasks to handle them (Paragraph 5.2).

4. Findings

This section includes an overview of the analyses produced by the LCU Team during the first phase of its activity. These works were designed to define the target MNEs, investigating their role and evaluating their complexity.

4.1 The target groups and their impact on nSBR

The size topic was investigated through the evaluation of the impact on statistical business registers. The LCU target list was defined on the basis of the Italian Business Register and the Italian Business Register of Enterprise Groups data. The procedure followed for a year 't' starts at the business group level. Two different orders for business groups are generated, by turnover and number of employees. After that, groups belonging to the top 200 ranking both for turnover and number of employees are selected. The third step consists in completing the list to obtain a total number of 130 business groups according to the turnover order only. Finally, worldwide top MNEs operating in the so-called digital economy, such as e-commerce and sharing economy, are added in the list even if their values are not very high in Italy. The total number of business groups annually included in the target is 140, 45 per cent foreign-owned MNEs, 41 per cent of Italian MNEs, and 14 per cent of domestic groups. Italian MNEs cover the 58 per cent of total turnover and 53 per cent of employment, while foreign-owned MNEs generate 35 per cent of turnover and 27 per cent of employment. Domestic groups account for 20 per cent of employment and seven per cent of turnover.

Enterprise groups in the target are formed annually and in average by 3,300-3,600 legal units[11]. By comparing years 't' and 't-1', generally, about 75 per cent of the enterprises appear in both the targets while half of the remaining units are not confirmed because of inactivity or liquidated in the year 't'. A longitudinal evaluation is also carried out to test the stability of the business groups in the target.

Due to the characteristics of the Italian system, mainly based on small and medium enterprises, statistical registers annually record 4.4 million

11 For the reference year 2016, according to the nSBR outputs, legal units coincide with the statistical unit "enterprise".

enterprises and about 220,000 of those belong to business groups (nearly 100,000). Therefore, coverage percentages found for other Countries as shown in Section Two (UNECE, 2011; UNECE, 2015a; Statistics Canada, 2018) are unexpected in our case. Enterprises in the target list represent annually less than one per cent of the total units in the nSBR. In terms of economic variables, they cover the eight per cent of total employment, 16 per cent of gross value added, and 26 per cent of total turnover. Considerable differences have emerged among NACE Sections and adopted criteria. Table 4.1 shows the NACE Sections greatly covered by the enterprises included in the LCU Team's target list.

Finally, it is important to consider that Section K (Financial and insurance activities) has been evaluated over the employment criterion only, showing a coverage value of about 40 per cent, while the contribution of top MNEs for Manufacturing (Section C) accounts for about eight per cent of total employment, nearly 18 per cent of turnover, and more than 11 per cent of gross value added. Employment criteria generally shows a great degree of stability over time, while turnover and gross value added are less stable.

Table 4.1 - Enterprises in the LCU target list: criteria for the evaluation of the impact in terms of economic variables. Main NACE Sections. Year 2016

NACE Sections	Employment	Turnover	Value Added
B Mining and quarrying	46,0	92,2	58,6
D Electricity, gas, steam and air conditioning supply	63,5	76,1	68,6
E Water supply; sewerage, waste management and remediation activities	17,8	22,4	26,5
H Transportation and storage	27,3	25,7	39,7
J Information and communication	19,1	45,7	41,8

Source: Authors' elaboration on Istat data

4.2 Contribution of top groups to STS monthly retail trade index

The analysis focusses on the contribution and the degree of cooperation of large business groups to the Monthly Retail Trade Survey and specifically assesses the weight of large business groups falling into LCU target list on total turnover in the retail industry.

For this study, in order to determine the weight of the units belonging to the LCU target list, SBS data on turnover were preferred against information from the survey, as values gathered through questionnaires included goods with different VAT rates and missing data. Furthermore, using absolute values from the survey is not recommended as indicators of retail trade rely on algorithms calculating percentage changes; therefore, to obtain absolute values, the whole information system of the survey should have been recalibrated significantly.

Restructuring of groups and enterprises could determine missing data for new units to be potentially included in the sample. When such an issue occurred, missing values were imputed using administrative sources (financial reporting statements) and SBR data.

Considering that the study was conducted during the initial stage of the project (end of 2016-beginning of 2017), in order to use structural information on turnover as previously stated, the selected reference year for analysing data was 2014. Businesses involved in the LCU target were merged to the sample of the Monthly Retail Trade Survey that for the reference year counted about 8,000 enterprises resident in Italy, classified as operating in NACE Division 47.

Results highlight that about 30 per cent of the business groups in the LCU target list were sampled in the Retail Trade Survey, having at least one enterprise for each group. The enterprises belonging to the target business groups were 89, representing just one per cent of the sample, however they contributed for 50.4 per cent of the total turnover of the retail trade sample for the year 2014. Another 23 enterprises belonging to LCU target list were not selected for the sample even though they were eligible, however their potential contribution to total turnover accounted approximately for a further two per cent.

Generally speaking, large groups demonstrated a very active cooperation and showed a high response rate, especially larger enterprises in terms of employees. The analysis revealed that eight groups (out of 40) partially cooperated, as several enterprises answered the survey, while other enterprises from the same group did not provide the required data; just one of the non-respondents was a very large enterprise. Concerning this latter case and for two more enterprises, the top management of the business groups officially

declared to Istat that their policy does not allow them to share their sales figures (even when surveys are mandatory). Failure to complete and return a compulsory questionnaire results in legal action handled by a designated Istat division. An enterprise group refusing to cooperate represents a crucial (and actually the most negative) signal to be considered by the LCU to decide whether to build relations with the businesses.

4.3 Contribution of top groups to STS turnover services index

This work has the objective to verify the impact and the degree of cooperation of the business groups in the LCU target list for service industries in complementing the analyses based on size dimension (Paragraph 4.1). Enterprises in the sample of the quarterly survey on Turnover Services (FAS) for 2014 were approximately 21,500, of which about 7,100 belonging to business groups for the same year. Concerning the LCU target list, 393 enterprises were sampled in the FAS survey (about 11 per cent of the enterprises in the target list) belonging to 98 business groups (the 70 per cent of the groups in the scope).

The degree of cooperation was evaluated considering the quarters of the year 2014. A four-digit flag was introduced according to answers enterprises gave for each quarter (responses and non-responses were coded in all possible combinations of '1' and '0'): 360 enterprises (92 per cent of the target) answered for all the quarters; 12 for one to three quarters (3 per cent); 21 did not provide data for any of the four quarters (5 per cent). The involvement of top groups operating in Italy was evaluated in terms of number of enterprises in the sample. For nine groups, more than ten enterprises belonging to the same group were investigated, reaching the maximum of 24 in one case. For 18 cases, from five to ten enterprises of the same groups were sampled and another 46 groups were surveyed for more than two (and less than five) enterprises. Finally, 25 groups were represented in the sample by one enterprise only.

Considering the enterprise group level, the study highlighted an excellent degree of cooperation in the FAS survey. For the largest 20 groups, more than 90 per cent of their enterprises cooperated for all the quarters. Moreover, 48 groups (49 per cent of the business groups involved) investigated through

more than two enterprises answered for all the enterprises and all the quarters. In addition, it is also important to underline that the majority of the cases of missing answers for one or more quarters were generally justified by demographic events (mergers, split-offs) mainly concerning enterprises within the same groups and already in the sample. Only in two cases, a complete non-response was registered.

In terms of contribution, the enterprises belonging to the LCU target list that answered for all the quarters of the year 2014 represented 33.5 per cent of the total turnover. Also, it is important to note that for the service industries, the group dimension plays a crucial role. In fact, the respondents to the survey for all the quarters belonging to business groups covered for 2014 about the 88 per cent of the total turnover recorded for the survey.

4.4 Financial reporting and KAUs

This section summarises the results of the analysis of a small number of large companies belonging to enterprise groups in the LCU target list in 2016. The aim is to investigate the presence of information about different economic activities coexisting within the same company to identify potential KAUs.

Data from the SBS Total Survey on large enterprises (SCI) referred to the year 2015 were analysed in order to evaluate the presence KAUs and the results indicated that less than one per cent of the enterprises (86) provided economic data on this statistical unit. SCI is annual survey concerning the economic accounts of the enterprises, including professional and artistic activities, with 250 or more persons employed.

In order to identify complex business organisations, the 30 largest companies in terms of both gross value added and turnover were considered and then, eight of those which did not declare any KAUs in the SCI survey were selected for further analyses.

A more in-depth study of such companies was carried out by consulting different administrative and statistical sources. Financial statements from the business accounts represented the main source of information, especially sections related to Income Statement, notes to the financial statements

and Management Report. The nSBR was also examined to check whether information found in administrative sources had already been acquired by Istat.

Among the selected companies, one performs its principal economic activity in wholesale and retail trade industries, four in transportation and storage industry, two in manufacturing industry and one in the information and communication industry. For these selected companies, data from financial statements led to identify 19 potential secondary economic activities: 12 of them were both in the administrative and statistical sources, the remaining seven were not in the nSBR. Even if referable to a small sample, it is interesting to note that an average number of 2.4 activities were disclosed in the financial statements.

It is recognised that the use of data from business accounts in economic statistics can be challenging and often requires adjustments to move on to the basis required for business statistics and national accounts. Even though the analysis provided useful signals of different business lines coexisting in complex enterprises, the disclosure of this kind of information in the financial statements is strictly dependent on the reporting choices adopted by each enterprise. Furthermore, the comprehension of such information was not always immediate. In some cases, financial statements contain separate income statements for different business lines and identifying the secondary economic activities was easy. Details on revenues and operating costs could also allow to easily determine the economic importance of each activity and its contribution to the overall business income. In other cases, financial statements contain the overall income, and the existence of secondary economic activities could be only presumed from the Notes to the Financial Statements or from the Management Report.

In addition, this analysis pointed out that the statistical information gap on operative and organisational aspects characterising companies that are particularly relevant on the Italian scenario. Seven potential secondary economic activities identified through administrative sources were recorded neither in the Survey nor in the nSBR and three of them were closely related to the company's mission and economically significant. The remaining four potential secondary economic activities do not characterise ordinary operations and marginally contribute to the overall revenue of the single

enterprise but, in some cases, they could have a significant impact in terms of industries involved.

4.5 Business Lines and complex units (MPSUC survey)

Within the framework of 2011 Business Census, in 2014, Istat conducted a multi-purpose survey on top Italian enterprises or enterprise groups (MPSUC). The objective of the survey was measuring the characteristics of the resident companies that present a considerable degree of complexity in organisational models and decision-making processes.

The reference year of the MPSUC survey is 2013 and about 3,000 complete, coherent and useful questionnaires for publication were collected (response rate of 90.2 per cent).

Enterprises and business groups were split into the following three sub-groups:

- companies or main groups (A): companies or groups of companies that in the three-years period 2011-2013 achieved, on average, a turnover equal to or greater than 2.5 billion euros or that had at least 10,000 employees.
- companies or large groups (B): companies or groups of companies that in the three-years period 2011-2013 achieved, on average, a turnover lower than the values recorded for the main companies or groups but in any case, equal to or greater than 250 million euro and which had at least 500 employees (but less than 10,000).
- medium-large companies or groups (C): other companies or groups other than the main and large companies that are included in the survey sample according to the defined criteria.

For the respondents, 4,680 business lines able to show the complexity aspect (see Section Three) were collected. For what concerned this survey, a business line could be defined according to the following criteria: identifying a relevant and identifiable segment of the economic activities carried out within the company; generating revenues and costs; information available in a structured and non-occasional way on the costs and revenues generated by the individual business line; operating results periodically reviewed

at the highest operational decision-making level. According to the results, respondents generated 1.6 business lines on average. The complexity of the companies increases with the size: the companies or main groups presented on average about three business lines in Italy and one business line abroad; the companies or large group presented on average one business line in Italy and one business line abroad.

It is important to underline that 71 per cent of the respondents declared to operate through one business line. The rest, about 850 enterprises/groups, carried out their activities running more than one business line (in total, about 2,500). Thus, these respondents operated with an average number of three business lines. For the sub-groups, the situation was as follows: for group A, the average number was 3.5; for group B, 3.4; and for group C, 2.8.

Concerning the criteria used by the groups/enterprises to define the business lines, table 4.2 synthesises the answers for the three sub-groups. Different types of products/services (62.5 per cent) and different production processes (27.6 per cent) represented the main criteria for defining the business lines covering more than 90 per cent of the cases. Different market location mainly affected main groups while different customers played an important role especially for groups A and B.

Table 4.2 - Criteria for the definition of the business lines by economic dimension (percentage values). Year 2013

SUB-GROUPS	MAIN CRITERION					
	Different production processes of products/services	Different types of products/services	Different market location	Different customers	Others	Total
Group A	24	58,7	9,3	8	-	100
Group B	27,1	57,8	4,7	9,7	0,8	100
Group C	28,3	64,8	2,4	3,4	1,1	100
Total	27,6	62,5	3,6	5,3	0,9	100

Source: Istat, Multi-purpose survey on top Italian enterprises or enterprise groups (MPSUC)

Furthermore, in order to assess the degree of stability of the business lines reported in the MPSUC survey, 16 of the most relevant business groups within subset A were selected and further scrutinised for the period 2013 - 2016.

Consolidated financial statements were the main sources used to compare the results of the MPSUC survey. Statistical units were linked to the Italian Business Register of Enterprise Groups in order to evaluate the hierarchical control chain position of the respondent within the enterprise group structure. When applicable, a comparison was made between business lines collected via survey and operating segments (IFRS 8) disclosed in the consolidated financial statements.

During the period 2013 - 2016, in seven cases (out of 16) the number of business lines did not change while in four cases changed due to internal reorganisations (two increases and two decreases). A very complex organisational change was found in one case because the group adopted a Countries/Divisions matrix in comparison to the previous one based on business lines. Finally, in four cases, differences were found also for the reference year 2013 even if not very significant in terms of number of employees and turnover. In these cases, the number of business lines indicated in the MPSUC survey differs from those indicated in the consolidated financial statements for two reasons: for the purposes of the survey, respondents merged business lines disclosed separately in the financial statements; holding activities was not considered as business lines in the survey.

Results show that more than a half of the business groups in the sample modified their structure in terms of disclosure of business lines during a period of three years.

4.6 Reorganisation signals

To investigate complexity, the LCU Team decided to mainly focus on the analysis of restructuring signals. The basic idea is to analyse signals in a wider perspective considering business groups or sub-sets of them.

Firstly, an evaluation could be carried out by analysing the requests collected through the Business Statistical Portal which is the infrastructural solutions Istat has adopted as single access point to data acquisition systems. The web device also allows respondents to send their requests to the survey and registers managers.

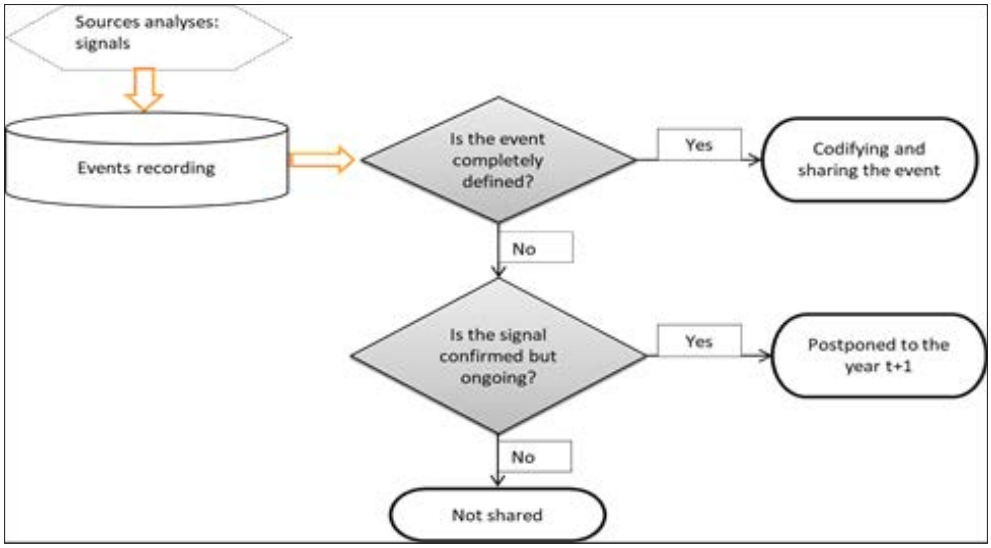
Concerning our purposes, analysing this kind of requests has a crucial advantage: data are stored in a dedicated repository and can be immediately processed. In fact, the records contain internal identification codes that link them to the nSBR. Therefore, evaluating the requests for the enterprises belonging to the business groups in the target offered the chance to build a provisional database to retrieve indications on potential complex restructuring of the main groups active in Italy. In that way, the analysis of the signals determines an ex post evaluation of the cases.

Secondly, according to the experience of the colleagues working on FATS statistics, a further possibility to early discover complex restructuring events resides in analysing articles in specialised newspapers and magazines and public sources. The aim is to capture relevant signals about events that may significantly change the structure of the main enterprises of business groups with large implications at national and international level. The main source for this activity is '*Il Sole 24 Ore*' which is the main Italian daily business newspaper, but also other specialised magazines could be considered. In this case, the activity could be assimilated to an *ex ante* evaluation of the signals.

Due to this latter characteristic, the activity is fully consistent with the main purpose of the project that is identifying the effects of complex restructuring of MNEs at the early stages of the statistical production process. At the same time, the main risk consists in sharing news of a poor relevance for statistics or not completely defined. To reduce this risk, the activity should consist in evaluating and then sharing public news when they are certain, with significant effects from an identifiable starting point, and able to influence the statistical outputs or affect the contact activities with the large and complex units. In addition, another important risk is related to the fact that news must be firstly codified to identify the units affected by the event.

This study resulted in defining the process that the LCU Team should follow to monitor day-to-day activities starting from publically available sources (figure 4.1).

Figure 4.1 - Monitoring from publically available sources - the process



Source: Authors' elaboration

5. International aspects

This section includes the description of external inputs deriving from international projects and initiatives that helped LCU team defining part of their day-to-day tasks.

5.1 Eurostat Early Warning System (EWS) network

Globalisation has created new business opportunities for MNEs and challenges for NSOs in producing effective business statistics and National Accounts aggregates. For instance, a rapid record of a business re-organisation of an MNE has become particularly difficult in terms of data collection, production, and statistical analysis, especially when crossing national boundaries and having sizeable effects on the European (and beyond) and National Statistical system. In response to the needs of NSOs, in 2017, Eurostat established the Early Warning System[12], to ensure broad consistency in applied methods, statistical treatment and communication of results across the European Statistical System (ESS). The EWS has been conceived as a structured, light developing procedure based on the voluntary cooperation among National Authorities dealing with official statistics. Coordinated by the Eurostat EWS-secretariat, the network of national EWS correspondents aims to early exchange information on restructuring events across Member States directly concerned, by achieving an agreed methodological treatment of the cases. As National Accounts main aggregates and the Principal European Economic Indicators (PEEIs) are concerned, NSOs are Members of the EWS. Moreover since 2018 Eurostat has been cooperating with the European System of Central Banks (ESCB) and the European Central Bank (ECB), which has become part of the EWS network of correspondents.

The timely and interlinked communication among EWS Members, respecting the statistical confidentiality, ensures that the restructuring cases are treated consistently addressing issues related to business statistics and National Accounts revisions. Hence, the individual cases are discussed by an *ad hoc* task force composed by national correspondents of the Countries

12 Eurostat, 'An Early-warning System (EWS) for the correct and consistent statistical treatment of restructuring events of multinational enterprise groups and their enterprises in European statistics', March 2020. https://ec.europa.eu/eurostat/web/economic-globalisation/early-warning-system

affected by the globalisation event. Moreover, the EWS correspondents[13] of the Countries and Eurostat share only necessary and limited information on the specific restructuring case when dealing with consistent statistical treatment of single globalisation cases. NSO reports containing the description of the restructuring case, information on affected statistical domains, the list of other Countries which may be concerned and methodological assessment are stored by Eurostat in the secure collaborative platform used for sharing information and resources (S-Circa BC). The general access to this group is restricted to EWS correspondents and the case-specific information are available only for the NSOs that are directly involved. As a result of the case discussions, Eurostat produces an anonymised methodological summary note containing the case statistical treatment agreed by EWS Members concerned.

To develop further methodological and conceptual guidance on restructuring of MNEs, Eurostat is planning to involve the OECD in the EWS, to address globalisation events adding further value, when non-EU countries are affected.

At national level, the Italian Institute of Statistics is committed to EWS through the LCU Team. To identify and to analyse the EWS cases related to MNE restructuring and globalisation issues, Istat has set up a small group of experts in various domains within the LCU Team. Within the framework of EWS, the LCU team works closely on business statistics by liaising with National Accounts experts, to ensure that EWS correspondents appropriately deal with MNE cases. By capturing the impact of globalisation through business statistics and national accounts aggregates, the multi-skilled team are involved by EWS correspondents when the MNE case needs to be analysed or detected.

5.2 Other international initiatives

As described in Section 2, the wider-international dimension of the MNEs requires an answer that goes beyond the national perspective (or EU perspective) not only to analyse the restructuring events, but also to deepen the knowledge of the global operations of the largest business groups, regardless of organisational changes.

13 The EWS network consists of two national correspondents nominated by each National Statistical Institute and each International Authority dealing with statistics.

Concerning the former aspect, the main answer of the ESS has been the development of the EWS (Paragraph 5.1) while, for the latter, Eurostat has launched several initiatives to analyse the current treatment of MNEs among different countries. Studies focussed on implications of MNEs activities in compiling national accounts and the GNI MNE Pilot exercise, launched by the Joint BSDG/DMES[14] Task Force on globalisation, falls specifically in this stream of analyses. Considering the purposes of the GNI MNE Pilot exercise, it is interesting to note that the work of the LCU requires a coordinated and consistent approach to different tasks, such as EGR, EU Profiling, and all the other initiatives related to LCU programmes (Alajääskö *et al.*, 2018). Furthermore, mainly for National Accounts purposes, other actions, such as the Integrated Global Accounts and Global Production (IGA) and the Full International and Global Accounts for Research in Input-Output (FIGARO) projects, dealt with the globalisation-related aspects and their possible implications to the accounting frameworks at EU and national levels. Regarding large and complex enterprises, the Voorburg Group on Service Statistics[15] also dedicated a specific poster to the topic in the meeting hosted in Rome in 2018[16] while, in the same year, the Working Party on International Trade in Goods and Trade in Services Statistics emphasised the increasing use of LCUs solution within the NSOs to better understand complex issues[17] such as globalisation and digitalisation.

The Global enterprise perspective introduced in the UN volume "The Guidelines on Accounting for Global Value Chains: GVC Satellite Accounts and Integrated Business Statistics" (2009) has also shed new lights on the way a MNE can be analysed in a wider perspective. In fact, according to the business statistics framework introduced by these guidelines, the global enterprise activities can be broken down first by business line and then by the supporting business functions, which together define the business process. In addition, each business function of a business line can be carried out inside or outside the global enterprise and can be located either in the resident country or abroad (UN, 2019 Part three, Integrated business statistics). Such a framework could be very useful in complementing the complexity analyses in

14 BSDG: Business Statistics Directors Group; DMES: Director of Macro-Economic Statistics.

15 https://www.voorburggroup.org/

16 https://www.istat.it/en/voorburg-2018

17 http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=STD/CSSP/WPTGS(2018)3&docLanguage=En

defining the groups in the NSO target. However, different linkages are needed between the business functions and the industrial / product classifications used within NSOs.

Finally, different proposals have been made for the establishment of an LCU network. The work of the UNECE "Task Force on Exchange and Sharing of Economic Data", established by the Bureau of the Conference of European Statisticians (CES) in 2017, highlighted the growing need to set up and coordinate an international network of experts on MNEs in order to exchange experience and best practices in data sharing, and metadata type information on MNEs, such as their structure and the available sources. The network could also improve the sharing of information on tools and techniques.

Eurostat has investigating the topic of an LCU network launching new projects also considering different forums of related aspects such as profiling and macroeconomic statistics. The benefits of such a structure could be summarised as follows: "An international network of LCUs seems to be the right answer to facilitate the necessary exchange of relevant information. LCUs may have a special role in facilitating international work towards better understanding MNE groups. LCUs could provide a point of contact between NSOs for MNE group profiling and data exchange. The active involvement of LCUs in international work and the follow-up of results achieved in recent international initiatives would support national work on MNE groups" (Hussain *et al.*, 2019: 54). Because of the importance of the ongoing international initiatives, the LCU team members have been variously involved in different projects in order to follow the advancements in these fields.

6. Discussion and conclusions

During the first period of its activity, Istat Large Cases Unit Team conducted several studies in order to determine the business groups in the target list, their contribution to the National statistics, combining size and significance aspects and their complexity, proxied by the multi-business concept and business groups restructuring signals. International projects were also considered to follow the international debate. Therefore, the organisational solution Istat adopted to deal with the inconsistencies of the top MNEs involved setting up a dedicated team and improving the connection to global networks, such as the Early Warning System (EWS).

Analyses were conducted to examine both the characteristics of the national economy and the internal organisation of Istat, focussing on the team mandate that relies on identifying the effects of complex restructuring of MNEs at the early stages of the statistical production process.

Business groups in the target were defined in terms of size, based on turnover and employees, and their impact on national statistics. The result of the selection method consisted in 140 business groups in the target per year. Due to the characteristics of the Italian system, mainly based on small and medium enterprises, the enterprises in the target represent annually less than one per cent of the total units in the nSBR, the 8 per cent of the total employment, the 16 per cent of the gross value added, and the 26 per cent of the total turnover. Business groups have a greater impact on the two STS surveys considered for this study, contributing for more than a half of the total turnover for the Monthly retail trade survey and more than one third for the quarterly survey on Turnover Services. These studies also show an excellent degree of cooperation of the top business groups in the target in answering the NSO's surveys.

Considering the results of these studies, the characteristics of the LCU based on a network of experts working part-time at the project and the presence in the organisational chart of other initiatives related to globalisation aspects, the number of 140 business groups for monitoring activities appears to be feasible and also confirmed for the following years.

Complexity was firstly investigated by the multi-business concept. An analysis combining statistical and administrative sources was conducted and even if associated to a small sample of enterprises, an average number of 2.4 activities were disclosed from financial statements. In total, 19 potential secondary economic activities were found: 12 of them were both in the administrative and statistical sources while the remaining seven were not in the nSBR. To consider that none of them reported KAUs data in answering the SBS Total Survey on large enterprises (SCI). Concerning the same topic, according to the multi-purpose survey on top Italian enterprises or enterprise groups (MPSUC), 71 per cent of the respondents declared to operate with one business line but about 850 enterprises/groups carried out their activities with more than one business line (an average number of three business lines). It is very interesting to note that the number of business lines increases by the size of the units: 3.5 for the main groups; 3.4 for large groups; 2.8 for medium-size groups. These studies show that the presence of several activities within the same companies is a very frequent feature and that it is even more relevant for larger companies. Different types of products/services (62.5 per cent) and different production processes (27.6 per cent) represent the main criteria for defining the business lines covering more than 90 per cent of the cases. However, the complete evaluation of the different businesses carried out by an enterprise is a demanding and time-consuming activity requiring an in-depth study of the financial reports that generally are available at least six months after the reference period. For this reason, in order to investigate the complexity at an early stage of the process, the LCU Team focussed on analysing restructuring signals in a wider perspective, by considering business groups. According to these findings, LCU monitoring activities should be based on processing different signals to obtain a complete comprehension of the business reorganisation and to share a quick assessment of the impact for the statistical domains. Requests collected through the Business Statistical Portal, news from specialised newspapers and magazines and Eurostat EWS cases, emerged as the main research streams useful to consider in defining and carrying out the LCU monitoring activities.

The work underlying the paper – setting up a specific unit inside the organisational chart dedicated to large and complex MNEs – is a topic of growing interest for official statistic and is important to address the challenge of the impact of globalisation to the quality of economic statistics, ranging

from the business register all the way through to the quality and interpretation of the estimates of productivity. In terms of contributions, findings have firstly a practical implication for Istat, helping in defining the daily activities to be carried out by the Italian LCU team. Describing the Italian experience, the paper also aims to contribute to the international debate on the topic, providing suggestions for other NSOs wishing to set up similar-type units and affording similar challenges.

Even though this contribution consists of a synthesis of different studies made during the first phase of the project, some limits have been identified. Firstly, from an organisational perspective, part-time basis represents a good solution to create networks but for some members of the LCU Team, the working percentages on the project cannot be spread over the whole year and the ability to react quickly to the signals could be reduced due to the peaks and milestones of their other activities. Furthermore, restructuring cases are randomly distributed during the year and, accordingly, the LCU Team is not able to completely schedule all the activities to carry out well in advance. Even though limited by the internal organisation dispositions, obtaining an increase of the involvement percentages in the LCU for at least a part of the staff would maximise the results of the team.

Concerning future works, the improvement of inter-organisational relations represents the next main step to consider for the LCU Team. That implies the need to evaluate and setting up procedures to cooperate at different levels: from more informal ways within the same Directorate (in our case, Economic Statistics) to more structured protocols with other Directorates, such as Data Collection and National Accounts. For example, maximising synergies with the National Accounts team to deal with specific aspects such as economic ownership, contract manufacturing agreements, merchanting companies and enterprises with intellectual property product (IPP), would be crucial for a successful action. Furthermore, external relations with respondents and partnership with other national and international institutions need to be properly handled, in the first case to always obtain the necessary cooperation from the most relevant business groups and, in the second case, to have an increasingly complete view of the problematic aspects related to globalisation. Evaluating the degree of cooperation of the business groups in the target should represent the preliminary step to build solid relations with

key respondents. Early studies show that top MNEs are keen to cooperate even though several difficulties emerged when asking questions related to specific globalisation issues. An effort in adopting a more user-friendly language, and less strictly statistical, should be made. Finally, it can be noted that even if limited in number, the EWS cases can determine an impact on the registration of variables and flows, highlighting the importance of improving relations with other countries.

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The task definition process for Istat Large Cases Unit

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Abstract

The international debate on Large Cases Units (LCUs) has increased rapidly in recent years. Worldwide operations of Multinational Enterprises (MNEs) can deeply impact on the production of official statistics and setting up dedicated teams for handling MNEs has emerged as a key topic. However, the notion of such LCUs within a National Statistical Organisation (NSO) appears as a multifaceted concept. According to the experience of the Italian National Institute of Statistics - Istat, the main objective of this paper is to describe the steps followed in the first phase of the LCU project in defining the operational tasks needed to detect complex operations involving top MNEs that may affect both the quality of national statistics and the international comparability.

Keywords: MNEs, official statistics, LCU tasks, consistency, companies restructuring Early Warning System (EWS).

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1. Introduction[2]

As worldwide operations of Multinational Enterprises (MNEs) can deeply impact on the production of official statistics, the setting up of dedicated teams for handling MNEs has recently emerged as a key topic. According to the Italian National Institute of Statistics - Istat Modernisation Programme (2016), a Large Cases Unit (LCU) team responsible for dealing with the inconsistencies of the top business groups operating in Italy has been established within the Directorate for economic statistics (DCSE)[3]. The main objective of the LCU is keeping the internal users – business statistics and national accounts experts – informed on the main restructuring events by identifying the effects of complex corporate restructuring at an early stage of the statistical production process.

The international debate on Large Cases Units (LCUs) has increased rapidly and in many different contexts. National experiences focussed on organisational aspects, such as the placement of the LCU within the National Statistical Organisation (NSO), but also analysed methodological topics, *e.g.* role, responsibilities, tasks and relationships (see among others, Statistics Canada, 2018; Wieser and Vennix, 2014; Connolly, 2011). Aiming at sharing common methods and best practices, some chapters on LCUs or similar activities have been included in international manuals, such as the United Nations Economic Commission for Europe (UNECE), Eurostat and the Organisation for Economic Co-operation and Development (OECD) guide on the Impact of globalisation on National Accounts (UNECE, 2011), the UNECE Guide to measuring global production in 2015 (UNECE, 2015) and the UNECE - Conference of European Statisticians (CES) Guide to sharing economic data (UNECE, 2020). The contribution of LCUs from different countries to GNI (Gross National Income) MNE group pilot exercise (2018-2019) could be regarded as a valuable experience, as this partnership set up within the European Statistical System was designed to verify the reliability of GNI considering globalisation issues.

2 Although the article is the result of a joint work, the single paragraphs are authored as follows: Paragraphs 1, 2, 3, 4.2.1 and 5 by Simone Ambroselli; Paragraph 4.1.1 by Chiara Orsini; Paragraph 4.1.2 by Barbara Gentili; Paragraph 4.1.3 by Elisabetta Bilotta; Paragraph 4.2.2 by Fabiana Sartor; Paragraph 4.2.3 by Sonia Amante. Proofreading by Fabiana Sartor.

3 Official name in Italian *"Coordinamento delle unità economiche complesse"* (Coordination of complex economic units).

In a broader perspective, the main purpose of an LCU team should be improving "the quality, consistency and coherency of data, although there can also be other beneficial impacts such as better use of resources and reducing the statistical reporting burden on MNE groups" (Hussain, *et al.*, 2019: 45). However, the notion of such LCU within a National Statistical Organisation (NSO) is a multifaceted concept especially regarding tasks to be performed. Even though generally, LCUs are not involved in all the actions (Hussain *et al.*, 2019), tasks may vary greatly and they may include management of specific surveys, data collection, contacts with respondents, monitoring activities and National Accounts analyses.

According to Istat experience, the main objective of this paper is to describe the steps followed in the first phase of the LCU project in defining the operational tasks needed to detect complex operations involving top MNEs that may affect both the quality of national statistics and the international comparability. Therefore, this work is presented in the context of official statistics, and specifically focusses on the LCU's (or similar units) organisation.

Complying with the LCU official mandate and acknowledging the findings of several analyses conducted in the starting phase of the project (Ambroselli *et al.*, 2020), the tasks have been defined according to the following two perspectives. Firstly, aiming at identifying the effects of complex corporate restructuring at an early stage of the statistical production process has been labelled as 'monitoring activities'; secondly, helping in dealing with the inconsistencies of the top MNEs in cooperation with the other statistical domains potentially affected, has been tagged as 'MNE analyses'.

Although the paper contributes to the international debate on LCUs, it mainly has practical implications for enhancing our understanding in defining the LCU operational tasks to carry out in our daily activity in order to achieve the set goals.

Nevertheless, the identification of the LCU role and responsibilities within the organisation must be considered as part of an adaptive process able to guarantee the best options in handling top business groups problems in both national and international context. In addition, the tasks should always be tuned considering other initiatives conducted within the NSO to avoid duplications at national level.

The paper is organised as follows. Section Two intends to review different experiences concerning the responsibility of the LCU within the NSOs. The process followed by the Istat LCU team to define the tasks is discussed in Section Three while the description of the basic works that will be performed to fulfil the official mandate of the team are presented in Section Four. Discussion and conclusions are presented in Section Five.

2. Responsibilities of the LCU

Even though several globalisation phenomena, such as merchanting, global manufacturing, processing abroad or international transactions in intellectual property products, have been analysed at international and European level and guidelines for recording them have been developed (Alajääskö *et al.*, 2018), the need for boosting the efficiency in dealing with the measuring issues of global operations of MNEs is still relevant. Starting from 2016, Eurostat strategy, in addition to all the other projects and initiatives related to international measurement challenges, has been based upon two main actions. The first strategic action was developing a network, the so-called Early Warning System (EWS) (Limpach *et al.*, 2018), in which Member States notify Eurostat of relocation or restructuring events concerning MNEs, while the second strategic action was promoting initiatives and adopt concrete measures to improve the consistent treatment for MNEs which are not relocating or restructuring. Concerning the former activity, it is possible to recognise what Stapel-Weber and Verrinder (2016) have called as an '*ex ante* advice function' useful for the NSOs in the preparation of recording changes in MNEs structures. The latter action implies an integrated approach in which both business and macroeconomic statistics are involved: from the business registers to national accounts and Balance of Payment (BoP) passing through all the business statistics potentially involved. In particular, the strategy grounded on the use of the EuroGroup Register (EGR)[4] as starting point to have a common MNE structure helping in guaranteeing both internal and international coordination. Furthermore, all the initiatives already existing inside the NSOs, such as Profiling[5] and LCU work programmes, should be conceived to avoid duplication of work and progress faster[6].

4 EuroGroups Register (EGR) is the statistical business register of multinational enterprise groups having at least one legal unit in the territory of the EU or EFTA countries.
https://ec.europa.eu/eurostat/web/structural-business-statistics/structural-business-statistics/eurogroups-register

5 Eurostat Business Registers Recommendation Manual (BRRM, 2010) as "a method to analyse the legal, operational and accounting structure of an enterprise group at national and world level in order to establish the statistical units within that group and their links, and the most efficient structures for the collection of statistical data".

6 Guidelines from BSDG/DMES Joint Task Force on Globalisation concerning the MNE Pilot Exercise, June 2018. The Task Force was established in December 2016 by the Business Statistics Directors Group (BSDG) and Directors of Macro-Economic Statistics (DMES), in recognition of the need for a close cooperation between macroeconomic and business statisticians on globalisation-related issues.

After having defined the population of the groups in the target, according to Hussain *et al.* (2019) an LCU should focus on identifying and resolving the inconsistencies in primary statistical domains. In their contribution, they have identified a set of activities useful to treat inconsistencies at the early stage of the individual statistical processes before the dissemination. UNECE Guide to measuring global production (UNECE, 2015) offers another set of tasks derived from the results of a dedicated survey carried out by the Task Force on Global Production. In the first case, the authors have provided a contribution based on their personal assessment also considering that within the NSO usually there are other projects dealing with MNEs, such as profiling, while the second source have shown empirical results based on a review of national practices.

Combining the two sources, the following macro-groups could resume the potential LCU activities:

a) Contacts with the businesses.

Developing and maintaining regular communication and good working relationships with the selected MNE groups is an essential task for guaranteeing quality products. LCU could develop a new contact manager position, acting as a single contact point for the MNE group and other staff within the NSO. In that way, LCU experts could guarantee the necessary coordination between the NSO and respondents. On the respondent side, a contact manager could help in better understanding NSO statistical needs while, on the internal side, could enable the development of an integrated approach that offers mutual benefits and learning opportunities in dealing with business groups organisational changes. Holding meetings with companies could also be a specific task of the LCU, as a productive way to establish permanent relationships and to improve communication with the groups in the target. A face-to-face interaction could allow a smoother comprehension of the NSO requests and the adoption of a tailor-based approach.

b) Data collection.

In some countries, the LCU has been mainly related to data collection process. Different solutions have been adopted, such as choosing the most suitable method of data collection according to the group, eliminating duplicated questions and cutting the statistical reporting burden by reducing

the number of questionnaires. LCU could also be directly involved in data collection in different ways, coordinating the activities for all the existing surveys, conducting specific surveys or developing new tools and methodologies starting from companies' accounts.

c) Monitoring.

Monitoring activities broadly concern the process to identify current and forthcoming issues in data provision and data analysis. This task could be done at different stages of the individual statistical process, from data collection to data analysis. According to what emerged from the international debate through evidence and recommendations, the cornerstone of a successful LCU programme is an efficient strategy for detecting problems before the dissemination and for handling them in an integrated perspective.

d) Data analysis

In several countries, LCU responsibilities involve consistency checks of different statistical and administrative data within and between the statistical domains. In some cases, data analysis also includes imputations and data adjustments. Generally speaking, the purpose should consist in analysing the complete set of data provided by the groups. More in detail, tasks could also include the provision of consistent data for business statistics as well as national accounts and balance of payments, and the exchange and reconciliation of mirror data with other countries.

e) Profiling

Delineation and classification of the statistical units of the main business groups operating in the country is a task that in some cases is associated to the LCU units. Profiling helps in achieving consistency over statistical domains through the complete definition of the business groups structures and the delineation of the enterprises.

f) Other tasks

Under the label of 'other tasks', each country includes very different tasks, such as the development of standards and tools. This activity is particularly useful to improve consistency rules and the knowledge of the team members concerning accounting and fiscal aspects, able to affect the organisation of the business groups and their capacity to provide meaningful statistical data.

Based on these findings and according to its official mandate, Istat LCU has investigated on the main aspects to consider in defining the tasks of the team. Alongside external inputs, such as taking in charge EWS activities and following other international initiatives, business groups have been analysed considering their contribution to the National statistics and their degree of complexity (Ambroselli *et al.*, 2020). The team has adopted a new approach using an integrated overview of business groups, writing notes on restructuring events and case reports when needed. Furthermore, no additional data have been requested to the respondents in the classic form of a statistical survey. This procedure perfectly fits with the integrated system of Statistical Registers that has been recognised as one of the crucial elements of the Modernisation Programme.

3. Defining the tasks

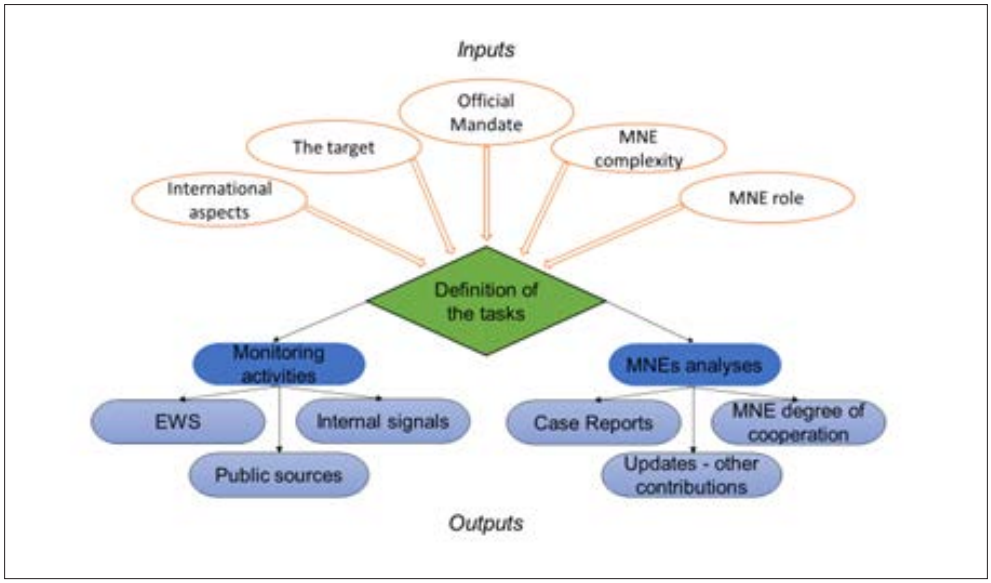
Annually, top MNEs in the LCU target have been defined starting from the Italian Business Register[7] and the Italian Business Register of Enterprises Groups data[8]. The procedure starts at the business group level and two different orders for business groups are generated, by turnover and number of employees. After that, groups belonging to the top 200 ranking for both turnover and number of employees are selected. The third step consists in completing the list to obtain a total number of 130 business groups according to the turnover order only. Finally, other 10 worldwide top MNEs operating in the so-called digital economy, such as e-commerce and sharing economy, are added in the list even if their values are not remarkably high in Italy.

After defining the first list of the 140 groups in the target, the LCU team conducted preliminary studies according to its official purpose, which is keeping the internal users, such as business statistics and national accounts experts, informed on the main restructuring events by identifying the effects of complex corporate restructuring at an early stage of the statistical production process. The contribution of the enterprises in the scope was evaluated for the national Statistical Business Register (nSBR), monthly retail trade index and services turnover index. While aiming at investigating the complexity, the LCU team focussed on multi-business aspect and on the analysis of restructuring signals. Furthermore, interesting hints derived from some international initiatives coordinated by Eurostat or other international organisations to guarantee coordination among countries in dealing with inconsistencies of global MNEs.

Figure 3.1 synthesises the process followed for the definition of the tasks.

7 https://www.istat.it/it/archivio/216767
8 https://www.istat.it/it/archivio/234313

Figure 3.1 - Process for definition of the tasks



Source: Authors' elaboration

Input analyses produced several results that have been combined and evaluated. Tasks have been defined according to two main streams of activities: monitoring activities (Paragraph 4.1) and MNEs analyses (Paragraph 4.2). The former activities mainly aim at identifying the effects of MNEs complex restructuring at the early stages of the statistical production process, while the latter ones help in dealing with the inconsistencies of the top MNEs in cooperation with other statistical domains that are potentially affected.

Monitoring activities are carried out both internally, by sharing signals on major restructuring events and externally through the EWS network. Internal monitoring activities are planned on the information collected through the Istat Business Statistical Portal[9] and public news gathered from specialised newspapers and magazines. MNEs analysis generally followed signals activated by the monitoring activities. In other cases, cooperation with different Directorates may determine other specific investigations. Furthermore, signals coming from distinct statistical units belonging to the same business group could be an indication of a complex reorganisation that

9 In Italian *Portale statistico delle imprese* https://imprese.istat.it/

need to be analysed more in detail. In such cases, an in-depth analysis is conducted and disseminated via specific reports. An assessment of the degree of cooperation in surveys through a group perspective may complete these case reports, which are normally updated when further information become available.

4. Day-to-day tasks

This section shows the tasks the LCU has implemented for its ordinary activity. According to the review of the activities generally allocated to the LCU (Paragraph 2), in our experience, day-to-day tasks are mainly referable to monitoring activities (c) with specific contributions for data analysis (d) both for national and international projects.

Working in cooperation with other Directorates, the LCU promoted preliminary projects concerning data collection (b) and contacts with the businesses (a). Speaking about data collection, in 2016 the entire process was entirely assigned to a new Directorate, thus the main contribution to this activity of the LCU is the evaluation of the degree of cooperation of the MNEs. As for the relations with the businesses, the LCU has established contacts also according to specific needs of the National Accounts Directorate. Furthermore, in terms of internal organisation, it is very important to underline that another Istat team is fully dedicated to profiling (e) and (EGR) activities.

4.1 Monitoring activities

International monitoring activities are carried out through the EWS network (Paragraph 4.1.1). Internal monitoring activities are based on the information collected through the Istat Statistical Business Portal, which is the web device focussed on retrieving data and managing contacts with all the enterprises (Paragraph 4.1.2), and on public news gathered from specialised newspapers and magazines (Paragraph 4.1.3).

4.1.1 The EWS flows

To understand the key concept of globalisation, various initiatives are bundled in EU to achieve coherence in methodologies and consistency in treating statistical issues. In line with European Statistical System principles, EWS aims to enhance statistical co-ordination, to promote integrated mechanism in exchanging information and to strengthen expertise in statistical areas. The interlinkages and integrated nature of the LCU are of crucial importance in ensuring that the purpose of the EWS is realised. Involving different expertise in the field of business statistics and National Accounts, the LCU team is able

to provide the lens through which to manage MNE restructuring cases in an effective manner. As the LCU works towards wider range of MNE issues, on the one hand Istat correspondents for EWS are committed to triggering EWS Secretariat to anticipate the possible sizeable effects on national and European statistics due to the restructuring of an MNE. On the other hand, EWS Secretariat may trigger Istat correspondents for EWS, requiring them to provide certain information of MNE statistical profiles in order to develop a new approach in achieving statistical consistency while fostering synergies among Member States.

Since 2017 the LCU has been proactively participating in several EWS cases, by developing concise and effective reports concerning the relevant cases, as well as by ensuring responsive, inclusive and participatory decision-making processes in the field of statistics. Therefore, EWS activity is among the most advanced of those currently carried out by the LCU.

The triggering mechanism of the network produces inward and outward flows of information between EWS Secretariat and the LCU, which carries out monitoring activities of MNE statistics related issues while strengthening cooperation with EWS in a coherent and consistent manner. For both inward and outward flows, when MNE event is identified, which may include MNE mergers, acquisitions and restructuring, Istat correspondents for EWS, members of the LCU team, receive data and information from the experts working on the concerned statistical domains. Although generally limited to few variables or very specific situations, a mechanism of involvement of the potentially concerned domains is activated, similar to the way in which case reports are drafted (see Paragraph 4.2.1). In fact, in gathering relevant statistical information related to MNE profile, an internal consultation across various statistical domains is launched, by investigating Structural Business Statistics (SBS), Short-term Business Statistics (STS), Statistical Business Register (SBR), Foreign Affiliates Statistics (FATS), the Statistics of industrial goods and services (Prodcom) and Foreign Trade statistics, as well as National Accounts aggregates.

With regards to outward cases, once collected all relevant statistical data and indicators combined with public information about the Company such as Corporate website and newspapers, Istat correspondents trigger EWS Secretariat by informing that the restructuring case may affect other Member

States and European statistics, accordingly. Istat correspondents provide the network with the MNE case overview containing the following information:

- detailed description of the restructuring case;
- statistical domains involved (*e.g.* STS, SBS, Business Registers, National Account aggregates);
- principal economic activity (NACE);
- estimated effects on the statistics;
- other countries which might be affected;
- timing of the restructuring;
- methodological assessment and proposal for statistical treatment;
- plans for communication to users.

The EWS secretariat establishes an *ad hoc* task force to collect information and to discuss the case involving the other Member States concerned. Integrating Member States opinions, EWS secretariat drafts Eurostat an interim report containing the information provided by the Member States and options to treat the MNE related statistics at the National and at the European levels. The mechanism of reaching consistency in statistical treatment of MNE case may require high-level institutional commitment, and effective and well-functioning inter-institutional coordination process, including, for instance, the involvement of the European Central Bank and National Central Banks. In close cooperation with the concerned correspondents, Eurostat produces a methodological note containing a summary of the case and an agreed methodological treatment to ensure a coordinated timing in the publication of first results and revisions. All the above-mentioned exchanging documents and information, including the methodological note and Member States opinions, are stored in a secure platform with an access only for correspondents differentiated by Case Group. Furthermore, as the agreed statistical treatment and consistent revisions may be applied to other cases, the repository of treated cases are available as anonymised explanatory notes containing the case description and the agreed methodological treatment for statistical unbalances available for all EWS members[10].

10 EWS Methodological summary notes
https://ec.europa.eu/eurostat/web/economic-globalisation/early-warning-system

Even if EWS is based on the voluntary cooperation among National Authorities dealing with statistics, enhancing expertise on global statistics is crucial in developing effective procedures and in accelerating integrated approaches that leverage synergies across different dimensions of globalisation related issues. The network established by EWS provides a developing mechanism to support Member States to deal with statistical inconsistency due to globalisation events in a coherent manner.

4.1.2 Signals from Istat Statistical Business Portal requests

Istat Statistical Business Portal (from hereon will be referred to as the Portal) is "a single entry-point for Web-based data collection from enterprises, which is at the same time an attempt to streamline the organisation and management of business surveys as a whole" (Fazio *et al.*, 2013: 1). As a communication channel, the Portal guarantees the possibility to interact with respondents. In fact, it is "a tool for optimizing the bi-directional communication between Istat on one side and the companies involved in the statistical surveys on the other side" (Papa *et al.*, 2018: 4). One of its key features consists in an integrated system that allows nSBR experts to manage the requests from enterprises in terms of changes (status and variables). The company can fulfil easily and quickly its obligations as well as monitoring the status of statistical requirements in real time; it can consult its situation in the nSBR and, if necessary, communicate changes receiving a response in real time. According to Consalvi *et al.* (2019), the tool has profoundly changed the methods of updating the nSBR from statistical sources and nowadays most of the updates of the register are collected through the Portal. Based on the management model adopted, an official application is activated for each request and a business register expert analyse and solve the case.

Concerning the LCU, monitoring activities aim at evaluating the signals from a business group point of view besides the enterprise level. In some cases, in fact, organisational changes in a business group consist in structural changes of several companies belonging to the same group.

From an operational point of view, all the requests sent via the Portal by the enterprises belonging to the business groups in the target are analysed. The full integration with the Business Register system allows the LCU team to

automatically process data as identification codes, type of requests, variables affected and dates. Through this procedure, a provisional database containing signals on potential complex restructuring events involving the groups in the target is built up.

Starting from the target as defined in Section 3, for the period 2014-2019, 122 business groups (87 per cent of the reference population) and a total of 712 companies (22 per cent of the whole reference population in terms of legal units) communicate via the Portal showing a good propensity to use the tool. Enterprises belonging to the target groups are substantially stable (for example, about 84 per cent of the units are present in the years 2017 and 2018) but the incoming and outgoing movements in terms of single enterprises from a Business Register perspective can be considered as well significant.

Table 4.1 - LCU target enterprises, requests per year. Years 2014-2019

YEAR	Number of requests
2014	58
2015	219
2016	273
2017	237
2018	187
2019	300
Total	1,274

Source: Authors' elaboration based on Istat Statistical Business Portal requests

Table 4.2 - LCU target enterprises, requests per variables. Years 2014-2019

TYPE OF REQUESTS	Absolute value	Percentage value
Mergers/split-offs	350	24.5
Status	95	6.7
Nace code (economic activity)	203	14.2
Name	288	20.2
Legal form	86	6.0
Insolvency proceedings	43	3.0
Address (administrative office)	363	25.4
Total	1,428	100.0

Source: Authors' elaboration based on Istat Statistical Business Portal requests

As shown in Table 4.1, 1,274 communications were received, 72 per cent of those cases were posted by the respondents. The rest of 28 per cent came from internal users, especially from short-term surveys. The requests were associated to 1,428 variables related to statistical classifications, demographic characteristics and structural changes (Table 4.2).

For LCU purposes, interesting signals concern structural changes, such as mergers, split-offs, requests for Nace code changes and communications about status and insolvency proceedings. In total, these requests amount to almost half (48 per cent) of the total. As previously mentioned, the main innovative aspect of our approach is related to the possibility to evaluate the requests according to a broader perspective (business group) in order to detect complex restructuring cases at an early stage of the statistical processes. For the most relevant cases, case reports are drafted and shared within business statistics and national accounts directorates (Paragraph 4.2.1).

4.1.3 Signals from specialised newspapers and public sources

Evaluating the signals from specialised newspapers and magazines constitutes the second leg of the internal monitoring activities. News is analysed and organised by year in a dedicated repository. At the end of the year t, the records are further scrutinised, and three different groups are identified:

a) events confirmed, codified and shared during the year t;
b) events postponed to next year t+1;
c) news not confirmed and not shared.

In terms of coverage, the activity concerns both the business groups in the LCU target and all the events that could involve Italian and foreign multinational companies in order to support the FATS statistics and the Statistical Business Register on Enterprise Groups processes.

Concerning the sources, the activity was mainly carried out by analysing the news reported by the specialised newspaper '*Il Sole 24 Ore*'. For the reference year 2019, the information sources treated were expanded: in addition to '*Il Sole 24 Ore*', the LCU used the 'Merger & Acquisition' report prepared by KPMG and the Newsletter distributed by the company Fineurop Soditic, specializing in mergers and acquisitions. This operation allowed an increase in the number and type of events reported.

The core objective is to identify the events that may involve the most significant enterprises or business Groups active in Italy and the impact for the statistics (acquisition projects, mergers, opening of new sites, liquidation, expansion projects abroad).

Before sharing the files, the confirmed events are checked and coded. This last phase must be as accurate as possible since the names of the companies involved must be traced back to the identification codes otherwise the information could not be used.

The undefined events are divided between those that have not materialised and those still being defined or completed. The events postponed are recorded separately so that they can follow their evolution over the following year.

For both groups of events confirmed and postponed, two distinct dissemination files are shared within Istat. Excel format to share the cases with a reduced number of variables has been chosen in order to obtain files that are easily and quickly interpretable. Content of both files is described in Table 4.3.

The report for the year 2019 created through analysing data on daily basis, summarises information on cases concerning companies and MNEs mainly involved in mergers/split-offs and sales or acquisitions of subsidiaries. While considering that the number of cases analysed is strictly dependent on the underlying economic reality and highly variable from year to year, for 2019 the number of events analysed compared to previous years has been more than double, also because new information sources have been fully exploited.

Starting from a total of 449 events analysed, those defined during 2019 have been 376 (Table 4.4) while in 3 cases their conclusion took place in 2020. In 37 cases the events have been postponed to the following year, while 7 cases needed further investigations. The latter situations have concerned very complex restructuring operations of large Italian groups. Finally, we found that in 26 cases the reports concerned only announced events that did not materialise.

Results in terms of type of monitored events for the year 2019 are shown in Table 4.5. Acquisitions of subsidiaries (or entire business groups) account for three quarters of the total, while the rest concern MNEs reorganisations both

internal and related to other parties (mergers, split-offs, sale and cessation of activities).

Table 4.3 - Content of the dissemination files

Dissemination file 1 - confirmed events	Dissemination file 2 - postponed events
Progressive identification code	Progressive identification code
Identification code main statistical unit	Identification code main statistical unit
Name statistical unit	Name statistical unit
Type of event	Type of event
Extended description of the event	Extended description of the event
Other Units' codes	
Other Statistical units' names	
UCI* name or GGH** name	
UCI or GGH country	
Group name involved in the event	
Survey on foreign-controlled companies resident in Italy (Inward FATS)/or foreign affiliates abroad controlled by Italy (outward FATS)	Survey on foreign-controlled companies resident in Italy (Inward FATS)/or foreign affiliates abroad controlled by Italy (outward FATS)
Indication of the different domains interested in the survey	
Territorial impact (IT/FRGN)	
Date (certain) of the event or reference year	
	Expected date of the event
Other notes	Other notes

Source: Authors' elaboration
*UCI: Ultimate Controlling Institutional Unit.
**GGH: Global Group Head.

Table 4.4 - Monitoring results. Year 2019

EVENTS	Number
Events carried out during the year	376
Events of large groups not yet defined during the year	7
Events postponed to the following year	37
Events closed in the following year	3
Events not occurred	26
Total events analysed	449

Source: Authors' elaboration

Table 4.5 - Type of the events carried out during the year. Year 2019

TYPE	Percentage value
Acquisitions	75.3
MNE internal events	10.7
Sale / cessation of activitieS	7.4
Mergers/split-offs	6.6
Total events carried out during the year	100.0

Source: Authors' elaboration

The analysis of 2019 data reveals that approximately 24 per cent of the events concerned acquisitions of Italian companies by foreign multinationals. In Italy took place 43 per cent of the operations (acquisitions, mergers, opening new offices), while 19 per cent of the operations were managed abroad by Italian multinationals; finally, approximately 14 per cent of the operations were carried out between foreign groups.

4.2 MNEs analyses

Case reports (Paragraph 4.2.1) and the evaluation of the degree of cooperation to the surveys from a business group perspective (Paragraph 4.2.2) represent the main outputs labelled as 'MNEs analyses'. Other *ad hoc* analyses are presented at the end of the Paragraph 4.2.3.

4.2.1 Case reports

Case reports represent the main tool the LCU team uses for sharing information concerning groups in the target, such as restructuring, changes of ownerships and impact on statistical units. The purpose of the task is carrying out concrete actions for the development of a coherent set of information useful to improve a consistent treatment of complex MNEs within different business statistics. Without prejudice to the autonomy of each production process, the aim of LCU reports is to facilitate a shared solution and the application over time of the same solutions for similar cases. Cooperation in MNE data treatment is a key task for the success of the LCU.

A case report is provided when MNEs reorganisations seem to be able to create 'breaks' in the statistical outputs. The urgency of the case is closely

linked to the needs of the involved domains. Currently, the variables under control are related to classification (Nace code), turnover and employment, as well as a general assessment of the structure of the groups in terms of statistical units. Checks are carried out by considering statistical data and Financial Statements (Annual Reports and Consolidated Accounts). By the report, an internal consultation of the concerned statistical domains is opened. Firstly, the assessment is made considering the effects produced (or that will be produced) in the short term and therefore able to have an impact on STS and SBR domains. At the same time, the other primary statistics (SBS, FATS, PRODCOM, Foreign Trade statistics) are involved to facilitate the most homogeneous treatment of the events in a wider perspective. For the same reason, a dedicated National Accounts team for the treatment of the globalisation process is also involved for assessing the need to investigate specific aspects not captured by primary statistics but necessary for the compilation of national accounts.

Operationally, the reports derive from signals collected via monitoring activities (Paragraph 4.1) or follow some specific needs emerged inside the NSO. Reporting is an iterative process that engages people in charge for the different statistical domains potentially involved. Comments and suggestions are collected via a dedicated email box or, preferably, writing using a track changes function inside a common protected area.

Table 4.6 - Case reports: checklists

Checklist 1			
Statistical Units	Impact		To do
Groups	Yes	No	Yes - go to Checklist 2
Enterprises	Yes	No	Yes - go to Checklist 3
Local Units	Yes	No	Yes - go to Checklist 4

Checklist 2 – Groups		
Variables	Impact	
Existing control links	Yes	No
New control links	Yes	No
UCI (GGH)	Yes	No
Complex reorganisation	Yes	No

Checklist 3 – Enterprises		
Variables	Impact	
Enterprise events (mergers; takeovers/break-ups; split offs)	Yes	No
Nace	Yes	No
Employment	Yes	No
Status	Yes	No
Headquarters	Yes	No
Others	Yes	No

Checklist 4 – Local Units		
Variables	Impact	
Headquarters	Yes	No
Local units (mainly factories)	Yes	No
Others	Yes	No

Source: Authors' elaboration

Reports contains the following parts:

- description of the event and data available;
- type of signal: internal/external;
- source of signal: monitoring activities; specific needs inside Business Statistics; input from other Directorates; international projects;

- evaluation of the impact for the statistical production in terms of statistical units (business groups, enterprises, legal units and, partially, local units) and variables (mainly, employment, turnover, economic activity classification and location);
- outcome of the preliminary analysis: the potential impact and the proposals/decisions for the involved domains;
- list of the involved statistical units (names and Register codes);
- contributors and contact persons for the case;
- version.

Even though the task is composed of a continuum of operations and some phases can be contextual or iterative, the following macro-steps have been defined to follow in drafting the reports, not necessarily in a rigid sequence. Classifying the signals and collecting further information and data concerning the case constitute the first macro-step of the activity and allow a quick evaluation of the complexity of the case. The actual handling of the case starts immediately after the first assessment and represents the core stage of the entire process: the urgency of the case is assessed, the inconsistencies are identified and described and the impact on the main users is predicted at a sufficiently detailed level of information. Basically, the evaluation should enable to answer the checklists of statistical units and variables showed in Table 4.6.

In this phase, the need for contacting the business could emerge and members of the LCU provide the necessary steps to organise the contact properly. At the end of this phase, information on the expected effects and operational proposals and/or decisions are added in the report.

The subsequent step consists in sharing the first draft of the report in order to obtain the involvement in the analysis of the thematic experts. In that way decisions to be taken could be refined and approved.

In the final step of the process, the final version (rev. 1) of the report is shared with all the statistical domains even if not immediately affected. It is important to consider that in our perspective the responsiveness in analysing the signals concerning complex cases is of primary interest even if new versions of the report could be made in case of relevant updates.

4.2.2 Business groups: degree of cooperation and statistical burden

A high response rate guaranteed by the top MNEs is a key aspect to obtain accurate statistical outputs. Either as a complement of case reports or as an independent analysis, one of the tasks of the LCU team concerns studying how business groups in the target cooperate in surveys, supplying tables for resuming and comparing data. For this purpose, a group perspective has been adopted for all analysis on cooperation.

While providing significant timely data and high-quality statistics, NSOs should always consider the need to minimise the reporting burden. Principle 9 of the "European Statistics Code of Practice For the National Statistical Authorities and Eurostat (EU statistical authority)" by Eurostat (2011 and revised edition 2017) states as "the reporting burden should be proportionate to the needs of the users and should not be excessive for respondents. The statistical authority monitors the response burden and sets targets for its reduction over time". Business groups generally express concerns over the statistical burden they have to bear while official statistical producers have to face increasing demands for information and a remarkable effort to be compliant with EU Regulations. Nowadays blending these opposing needs offers a compelling challenge to NSOs.

According to Istat internal organisational, each survey manager and the Data Collection Directorate are in charge of the burden evaluation, especially regarding the contents of the questionnaires. Furthermore, for each survey a dedicated team of experts check if the submitted questionnaires are filled in properly. Collaboration between the Data Collection Directorate and the LCU team allows measuring the actual cooperation of large business groups in official statistics, serving two main purposes. First, this analysis helps to assess the availability and the quality of the data (collected or estimated) used for consistency checks; secondly, it allows to evaluate the feasibility of requesting further cooperation (direct contacts,) especially for globalisation related issues. Furthermore, updates and new versions of the reports (see Paragraph 4.2.3) allow coverage assessment of data collection after restructuring.

Table 4.7 - Istat business surveys involving enterprises of the examined MNE group, 2017-2019

ECONOMIC BUSINESS SURVEYS	Business group enterprises								
	Ent.1	Ent.2	Ent.3	Ent.4	Ent.5	Ent.6	Ent.7	Ent.8	Tot
OCC1	X		X			X	X		4
RS1	X	X	X	X	X	X			6
PRODCOM	X		X	X		X	X		5
PPI_D	X					X			2
CIS	X		X		X	X	X		5
FID_MAN	X		X						2
ICT	X		X	X	X	X	X		6
RCL-SES	X		X			X	X		4
SCI	X		X	X		X	X		5
FATT	X		X				X		3
PMI				X					1
IPI	X		X	X			X		4
IULGI	X		X	X		X	X		5
INWARD	X	X	X	X	X	X	X		7
IS	X		X	X	X	X	X		6
PREIMP				X					1
CENS	X		X	X		X	X		5
Tot	15	2	14	11	5	12	12	0	71

Source: Authors' elaboration on Istat data
STS in grey
Labour Force Survey (OCC1); Research & Development Survey (RS1); Community Production Survey (PRODCOM); Producer Price Survey – domestic market (PPI_D); Community Innovation Survey (CIS); Business Confidence Survey of Manufacturing Industry (FID_MAN); Information, Communications and Technology Survey (ICT); Structure of Earning and Cost of Labour Survey (RCL-SES); SBS Total Survey on large enterprises (SCI); Industrial New Orders and Turnover Survey (FATT); SBS Sample Survey on small and medium enterprises (PMI); Industrial Production Survey (IPI); Survey on Local Units of Large Enterprises (IULGI); Activities of Foreign Enterprises in Italy (INWARD); Survey on International Sourcing (IS); Import Prices Survey (PREIMP); Businesses and Services Census (CENS).

When monitoring signals and case reports reveal that a group restructuring involves more enterprises and direct contacts, in order to get a clearer picture, the LCU team produces specific reports as showed in the following business case.

The business group considered for this example is an important foreign-owned MNE operating in Italy. Although its core business unit focusses on a productive activity, other enterprises of the group operate in several different fields orbiting the main mission.

Using the Portal, we could track down the list of surveys in which enterprises belonging to the MNE group were involved. Analysing the response rate for each enterprise of the group to different surveys has helped evaluate the weight of the actual burden on the whole group and to establish the degree of cooperation of the MNE.

The study revealed that the considered business group has 8 enterprises engaged in the Istat surveys (both structural and short-term) in 2017-2019. Table 4.7 shows the results of the investigation. The larger enterprises (1 and 3) were involved in almost all the surveys, while RS1 Survey, ICT Survey, INWARD Survey and IS Survey engaged more than 5 (out of 8) enterprises of the group.

The response rate to the Istat questionnaires has been rather high for six enterprises while in one case only half of the surveys has been filled. However, after the contact, percentages have increased for all the enterprises belonging to the group.

Direct contacts with the business have allowed also discovering that for the same period, the enterprises belonging to the group have received a relevant number of other surveys from National Authorities or other Public Administrations (9 mandatory out of 16).

A first attempt to extend this analysis to other MNEs shows that the majority of the MNEs tend to cooperate actively in surveys, therefore their average response rate is fairly satisfactory. However, MNEs often report having troubles disaggregating data into small geographic areas and by enterprise. The analysis of the statistical burden on MNEs revealed that notwithstanding the effort required to satisfy the demand for information, MNEs tend to cooperate in data collection. Overall, fulfilling these obligations has a cost for both businesses and NSOs, as excessive burden affects the quality of gathered data (redundant information and overlap between business surveys) and the efficiency of data collection process.

4.2.3 Updates and other contributions

Last stream of research concerning 'MNEs analyses' consists of cases updates and other specific contributions made in cooperation with other Directorates mainly for international projects or to establish direct contacts with the businesses.

As seen in Paragraph 4.2.1, when necessary, a case is updated according to new information, data or experts' evaluations (business statistics and national accounts). In these cases, the LCU team generally opts for drafting a new version of the report.

In other cases, as seen in Paragraph 4.1.3, some corporate reorganisations can be very complex and require very long time. The time that passes from the announcement of an event gathered from newspapers to its actual and complete realisation may vary: sometimes events close very soon, while every now and then events can last for months, especially when, for example, the authorisations of the National Competition Authorities involved are necessary. In these cases, the LCU provides some specific contributions that briefly summarised the main aspects of the ongoing operations, the current situation and a time estimation concerning the conclusion of the restructuring. Furthermore, internal identification codes are retrieved in order to connect information to the statistical units. A newsletter is prepared and disseminated to business statistics and national accounts domains. In fact, in this preliminary phase it is important for expert to think over the potential impact that the event, once concluded, could have on the production process which is affected. The newsletter is shared at non-regular intervals when relevant news is available. Given the public nature of the information collected and disseminated, there are no confidentiality issues and email can be used for dissemination.

In our experience, cases disseminated by this tool have covered a wide variety of aspects concerning the main business groups acting in Italy, such as governance, expansion abroad of Italian business groups, organisational changes in terms of legal units and company crises.

Other non-regular contributions have been made in cooperation with National Accounts Directorate in order to help define of specific issues of macroeconomic statistics. Usually, the LCU contribution is made at a preliminary stage, complementing the information from the profiling activity

with a general assessment of the business group regarding ongoing events that could substantially impact on primary statistics outputs and, as a consequence, on national accounts aggregates.

Finally, although to a lesser extent, other preliminary analyses have been carried out in order to get a complete overview of the activities of the business group before contacting the businesses. The LCU members contribute to summarise the context, evaluating the cooperation of the single entities belonging to the business group (as seen in the previous section) and looking for the best strategies to establish or maintain the direct cooperation with the respondents.

5. The LCU role: an adaptive process

In order to define the operational tasks needed to detect complex operations concerning the main business groups acting in Italy and able to affect both the quality of national statistics and the international comparability, the LCU team conducted several studies in the first phase of the project.

Tasks have been defined according to two different streams. The first set of activities consists in monitoring the MNEs to identify current and forthcoming problems in data provision and data analysis as a consequence of restructuring events. The second set of activities analyses top MNEs to manage data inconsistencies, alerting other potentially affected statistical domains. Even though a logical sequence can be recognised considering monitoring activities as upstream in forming the informative base from which in-depth and other contributions can be extrapolated, relationships could also follow other ways. Therefore, most of the tasks could run parallel with continuous interrelations in order to guarantee the necessary flexibility to the LCU project.

Three different small teams within the LCU follow the three different streams of research belonging to monitoring activities macro-group. For internal monitoring activities (Istat Statistical Business Portal; specialised newspapers and magazines) two different repositories are maintained and mutual exchange of data exist allows comparing the results by internal identification codes and events descriptions and typologies. Both the internal monitoring tasks can feed the international monitoring activities that are carried out through the EWS network. In fact, triggering complex restructuring cases that involve more EU Countries is a task of the LCU team both for inward and outward flows of information between EWS Secretariat and Istat. In the former case, EWS correspondents, members of the LCU team, receive the cases from the EWS Secretariat and then activate an internal mechanism in order to obtain the necessary feedback to define the Italian position concerning the case. In some of these cases, a re-evaluation of the signals gathered from the Portal could be necessary. For outward flows, the EWS correspondents, being aware of a restructuring event able to affect other EU Countries mainly by exploiting the results of internal monitoring activities, trigger the EWS secretariat to activate an EWS case discussion.

Relations between monitoring and MNEs analyses are mainly one-way even if some contributions on MNEs may constitute the starting point for an EWS outward case. Despite the high number of signals collected through the upstream activity, only few cases have the necessary characteristics – in terms of impact or complexity of the restructuring event – for drafting and disseminating a case report or other kind of contributions. As seen in the previous sections, case reports guarantee the development of a coherent set of information useful to improve a consistent treatment of complex MNEs within different business statistics, however the process is time-consuming and requires the involvement of several statistical domains. For these reasons, only very relevant cases have been chosen for reporting and follow-ups. Cases updates and other contributions, as well as the production of outputs concerning the actual cooperation to the survey according to a business group perspective, are more frequent but strictly dependent on external factors, such as the dynamics of the economic context and the needs of other projects. Operationally, the three tasks within the MNEs analyses macro-group are related by two-ways relationships.

Nevertheless, according to our experience, the identification of the LCU role and responsibilities within the organisation must be considered as part of an adaptive process mainly for the following reasons.

Firstly, the tasks should be always tuned considering the other initiatives conducted within the NSO to avoid duplications at national level. In general, crosscutting activities are difficult to accept within an organisation and the LCU is not an exception. The presence of several experts with different skills and engaged in other processes, has proved to be a solution suited to the context but, at the same time, has limitations. In such a situation, strengthening the endorsement by the top managers of the NSO may become essential to survive and guarantee the best options in handling top business groups problems for both a national and an international perspective. However, the ever-increasing interest on the topic of Eurostat and other international organisations has helped us in explaining and adjusting the tasks according to a wider perspective.

Secondly, the adaptation should also consider the labour force allocation balancing different needs, when possible. Currently, resources have been considered as sufficient for the LCU target definition, monitoring activities

and for participating in the EWS network. However, with regard to the MNEs analyses, more resources are needed. In fact, concerning the case reports, very good relationships have been established with the thematic experts obtaining a high degree of involvement, but LCU resources are not sufficient to ensure greater production and to follow the consistent implementation of the proposed solution for the cases.

In order to respond adequately to internal and external impulses and to be ready to partly modify its tasks or taking other responsibilities in charge, LCU future plans should also consider training and development of synergies.

Concerning the former, the training of the LCU staff should also be considered as an ongoing process. Promoting the enlargement of the competences for each member of the team could help in enhancing the understanding of the company side not only in terms of structure of legal units but also considering their actual internal organisations for aspects such as degree of internationalisation, regulatory changes that determined internal reorganisations and international accounting standard rules. Increasing the knowledge about MNEs operations in terms of legal aspects, such as Regulations and antitrust rules, International Accounting Standards and group taxation rules, emerged as a key urgent aspect to be developed by the LCU team. Furthermore, as international aspects tend to be very demanding, the LCU team might need to improve its knowledge on international networks operations and its skills to better deal with issues and obstacles (legal, administrative, statistical, technical and cultural) associated with international data sharing.

Concerning the latter, in order to exploit the organisational synergies, the LCU team has planned to collect and effectively keep track of Data Collection and National Accounts Directorates' needs, primarily for improving the effectiveness of direct contacts with the business groups and investigate on globalisation effects caused by activities of MNEs and their coherent and systemic reflection in statistical data. Cooperation with other national authorities, such as the National Central Bank, should also be favoured in order to both enlarge the sources available and include other statistical domains in the analysis. Finally, networking and sharing experiences on LCU work should consider both EU and non-EU countries. In the latter case, international organisations could promote actions to share best practises but also bilateral

studies to examine specific situations. Such practical applications would be more supportive to complete the analyses considering that MNE activities are not limited to the EU.

In conclusion, the article describes the practical implementation in Istat of the LCU tasks in the first years of the project. According to organisational aspects and preliminary studies, during this first phase, the main task of the Italian LCU has been providing information on important restructuring events concerning MNEs to internal users. In order to make the most out LCU work, future activities should mainly boost the identification process to define the restructuring effects on national statistics, assessing the consistency of MNE data from primary statistics and either cooperating with other statistical domains in dealing with globalisation issues or providing backing up for experts' individual decisions. Eventually, arrangements should be made to implement and subsequently improve the use of automatic checking procedures to detect and manage complex issues.

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