

Meeting of the Group of Experts on Business Registers

Organised jointly by UNECE, Eurostat and OECD

Geneva, Switzerland, 30 September – 2 October 2019

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Meeting the needs of structural business statistics Experiences from the Italian SBR

Abstract

Among the different roles of the SBRs, the provision of sample frames for survey-based statistics and survey support is relevant for ensuring high-level quality standards and success of surveys themselves, especially new pilot surveys. In particular, the Italian SBR has recently shown its points of strength and its aptitude, as well as flexibility, to satisfy new statistical and economic needs.

By presenting experience in developing a new data collection process on intra-flow transactions within the most relevant enterprise groups in Italy, necessary to ensure compliance to SBS Regulation No 295/2008, this paper is intended to describe improvements supported by the SBR to assist the new survey. As a consequence, the action has been aimed at fostering the correct implementation at national level of the new statistical unit (ENT) and the production of estimates on the structure and economic results of enterprises, consistent with concepts, definitions and classification criteria of statistical units in accordance with the Council Regulation (EEC) No 696/93.

Different types of innovation have been introduced in the design and management of the activity, both from a statistical and organizational point of view.

Starting from consolidated results of manual and automatic profiling activity, the SBR has:

- selected the units of analysis balancing the demands of different statistical domains,*
- provided an ad hoc sample frame by leveraging profilers' skills and experimental automatic algorithms,*
- monitored survey responses having an active role in the survey data collection process, and*
- produced new outputs by integrating respondents' returns.*

Special attention has been paid to the effects resulting from the close collaboration between SBR and SBS statisticians who have shared knowledge and methodologies in an integrated way which allows the SBR to meet growing and changing SBS demands and the SBS to improve final estimates.

Keywords: *national Statistical Business Register (nSBR), domestic enterprises and multinational enterprises (MNEs), national profiling, Structural Business Statistics (SBS)*

1 Introduction

An SBR is a vital component of the core statistical infrastructure supporting collection of economic data and production of economic statistics (UNECE, 2015).

The Italian SBR is currently involved in a revision of the BR Information System in order to correctly apply the definition of enterprise (ENT) in accordance with the Council Regulation (EEC) No 696/93 on the statistical units as well as to ensure compliance to Regulation (EC) No 295/2008 of the European Parliament and of the Council concerning structural business statistics. In particular, in line with the Vision Implementation Project “European System of interoperable statistical Business Registers” (VIP.ESBRs), supported by the European Statistical System (ESS), first steps toward the complete industrialization of the updating process of ENTs and the management of ENT-LeUs links have been reached.

Especially at European level the production and release of data on ENTs are required to solve measurement problems raised by multinational companies. Globalisation calls for comparable statistics in Europe and around the world, thus necessarily implying a combination between the pure economic view of business groups and the statistical treatment of enterprise groups (Alonzi and Migliardo, 2018) and Multinational Enterprise Groups (MNEs) are key players in national and international economies having a significant impact on statistics. However, their production arrangements are more and more complex, and their value chains are increasingly global, making it difficult to collect consistent data with regular statistical surveys. Traditional statistical surveys should be reviewed in order to answer such new informative needs on cross border phenomena. To achieve this challenging goal, the European Groups Register (EGR) together with the Statistical Business Registers (SBRs), acquires a central supporting role.

In order to test the new statistical unit and relative attributes, the Italian NSI has recently run an *ad-hoc* survey to collect data on the structure and economic data of ENTs on large groups; such survey¹, called “Intra-flow Survey” (in Italian “RFI”, which stands for “Rilevazione Flussi Infragruppo”) and addressed to a purposive sample of relevant Italian groups of enterprises, was successfully executed thanks to a close collaboration between SBR and SBS statisticians.

Significant innovations have been introduced in the design and management of the activity, both from a statistical and organizational viewpoint, thus allowing the SBR to meet growing and changing SBS demands. In particular, starting from consolidated results of manual and automatic profiling activity, the nSBR has: selected the units of analysis balancing the demands of different statistical domains (purposive sampling); provided an *ad-hoc* sample frame by leveraging profilers’ skills and automatic algorithms; monitored survey responses having an active role in the survey data collection process; produced new

¹ The survey questionnaire consists of two main sections (Faramondi, Migliardo and Trinca., 2018). The first part concerns the ENT structure. The responding unit has to validate the perimeter and business lines of the group which are proposed in the questionnaire; they had been previously identified by Italian profilers through manual or automatic profiling activities. What’s more, the responding unit may identify new ENTs and modify those which have already been identified by manual or automatic profiling activities. The second part is on economic transactions between the legal units belonging to the same ENT. The variables collected are non-additive variables; they include: revenues from sales and services, changes in inventories, changes in contract work in progress and other revenues and income, costs for the purchase of raw materials, accessories, consumables and goods, costs for services, costs for the use of third party assets, changes in stocks.

outputs by integrating respondents' returns. Indeed, the new organizational model, based on a strong collaboration between BR and SBS sections, has been the real strength of the goals reached by the survey.

This paper focuses on the description of the role of the SBR in facilitating, implementing and executing the survey and how these improvements have affected the SBR itself. In particular, each of the paragraphs of the paper is intended to present a major innovation. Paragraph 2 is intended to offer an overview on the organizational model of the whole activity. The third paragraph is focused on the selection of the units of analysis which has been aimed at balancing different informative needs coming from various statistical domains while the fourth paragraph describes how the complete set of statistical units for the survey was defined. The fifth paragraph is on the active involvement of the SBR in the activity of monitoring survey responses and the sixth paragraph presents the final output released by the SBR by integrating respondents' returns. Finally, some conclusive remarks are offered in paragraph 7.

2 The organizational model

The following paragraphs are intended to present some important innovations which have been recently introduced in the nSBR in order to support a new SBS survey starting from the definition of the sample to the analysis of responses. As already pointed out, a set of organizational innovations have been introduced, showing the aptitude, as well as flexibility, of the nSBR and its operators to satisfy new statistical and economic needs as well as to fully take part in the different phases of a statistical survey.

In particular, the close collaboration between SBR and SBS statisticians, who have shared knowledge and methodologies in an integrated way, has allowed the SBR to meet growing and changing SBS demands and the SBS to improve final estimates. Such a way of cooperation has been carefully planned within the directorate for business statistics and the way of working has been structured by setting up a pool of experts coming from the BR and SBS domains.

The new organization is made of two different layers: a top layer which encloses the management is organised in a hierarchical way while the lower one, represented by profilers, has a horizontal structure.

With regard to the higher level, the new pyramidal organization model sees the Director of business statistics at the top of the chain while the head of the BR section and the head of the SBS section support the Director in decision-making and staff training. In addition, three middle managers (the "delegates") have been identified: (1) the manager of the profiling team who has the task of guaranteeing support to new and old profilers for all aspects related to the ENT delineation and who has the responsibility of producing the relative final output, (2) the manager of multinational global statistics, who is also in charge of the new RFI survey on intra-flows, responsible for all front office activities as well as for the coordination of profilers for issues related to data collection, and (3) the manager of structural business statistics who has to support all consolidation aspects and is responsible for the production of final outputs on economic consolidation for ENTs. The three delegates work in a collaborative manner, sharing experiences and best practices. In addition, the model is supported by a responsible for the acquisition of administrative sources and intermediate outputs who also has to monitor process times and data flows produced in the different steps (data collection, ENT delineation and consolidation of economic

variables), with the scope to fulfill with target deadlines (sending final SBS estimates to Eurostat).

Moving the attention to the lower layer of the organization, with regards to the BR, it should be pointed out that in Italy, the majority of the BR statisticians is part of the Italian ‘EGR&Profiling team’. The Italian profiling organization model tries to assign the profiling responsibility of each MNE to the same profiler for different reference years. In such a way a resources saving is ensured thanks to an in-depth knowledge of the group and familiarity with its structure by the profiler who has already analysed the group for the previous reference year; however, a regular exchange of opinions is guaranteed within the team of profilers working in a collaborative manner through motivating weekly meetings. In addition, the EGR&Profiling team works in close cooperation with the IT staff to implement the new statistical unit ENT in the national BR informative system.

With the new organization model, the original EGR&Profiling team was supported by a group of SBS experts, who have been working on FATS (Foreign AffiliaTes Statistics) or are constantly involved in statistical surveys.

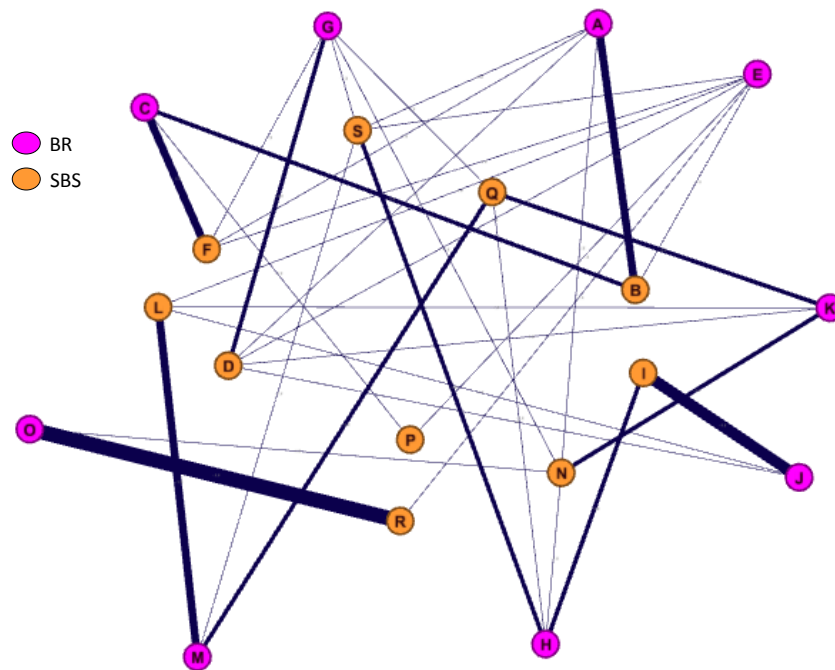
The strategic aim pursued by the directorate was to expand the existing group of BR profilers by developing workers’ skills so that they could be competent both on the definition of the ENT structure and on the consolidation of economic data; in a few words: SBS statisticians should have become profilers and profilers should have improved their knowledge of accounting data and SBS indicators. A second goal consisted in setting up ‘sectoral experts’; taking into account that different industries have different features especially with regards to economic measures, in the near future each of the profilers should be competent for one industry. To this end, business groups have been classified into seven productive sectors, with the purpose of identifying sectoral specializations: (1) *traditional manufacturing*, (2) *manufacturing sectors wide scale*, (3) *high knowledge industrial sectors*, (4) *high knowledge intensive services*, (5) *mining, utilities and oil industry*, (6) *transport and logistics*, (7) *commercial intermediation*.

To meet such objectives, several training activities have been organised: training on the job, *ad hoc* seminars to share guidelines and best practices with SBS colleagues and preparing Q&As to be discussed together. For example, on the occasion of a 3-days workshop, expert profilers have enriched frontal lessons with different discussions sub-groups formed both by SBR and SBS statisticians; exercises and case studies have been analysed in each of the sub-groups and results have been shared among all participants to the workshop. What’s more, in order to help newly formed profilers to get in touch with the profiling process and methodology, a short guide on profiling has been developed. In effect, the existing manuals on profiling are usually complex and new profilers risk to get lost in all documentation. Such new guide, called “10 steps to become a good profiler” (Alonzi and Marchettoni, 2019) has also been appreciated by Eurostat which has published it on the Wiki page on profiling in order to serve other NSIs.² In a similar way, SBS colleagues have organised training days on economic issues and SBS variables necessary to provide suitable support to respondents with regards to the second part of the questionnaire.

² Available at <https://webgate.ec.europa.eu/fpfs/wikis/spaces/viewspace.action?key=Profiling>

Besides training activities, the way of working has been carefully planned, too. Each business group under analysis, thus each collection unit, has been assigned to a couple of experts, one from the BR section and one from the SBS area looking for a full horizontal integration of knowledge, skills and tasks. In order to reach the maximum level of integration and collaboration different duos have been set up for different business groups to be analysed. The result is somehow shown in the graph below (Graph 1).

Graph 1 – The cooperation between BR and SBS experts for the new Italian RFI survey



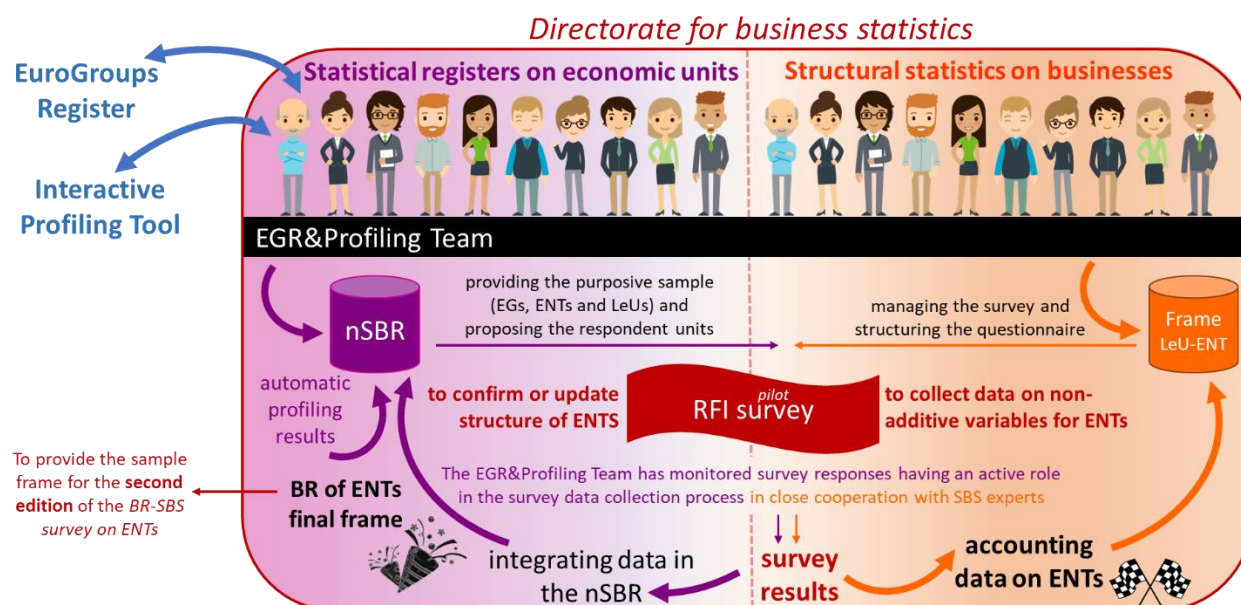
Each node represents a profiler: the pink nodes are the BR expert profilers while the orange ones are the newly formed SBS profilers. The team is formed by 19 profilers. The number of groups assigned to each profiler is described by the relative undirected edges which are weighted. For example, BR profiler E is in charge of analysing and collecting data for 7 MNEs and has to work in pairs with 7 different SBS experts (B, D, F, L, P, R, S). BR Profiler J cooperates with the following SBS statisticians: D (one group to be profiled together), I (four groups to be profiled together), L (one group to be profiled together).

The couples of experts were set up with a twofold aim: (1) to support and ensure training towards newly joined profilers such as in the case of the BR expert E, whose primary aim was to support and ensure training towards as many SBS experts as possible by collaborating with 7 different SBS experts in the study of 7 different groups, and, on the other side (2) to create a team of sectoral experts who would analyse in depth business groups operating in a particular economic sector such as the couple formed by the BR expert J and the SBS expert I, who were involved in the analysis of four groups active in trade intermediation.

Next to the organizational innovations described in this paragraph, the close cooperation between nSBR and SBS has implied the development of a set of different actions from the BR side to serve SBS needs in

managing and successfully running the survey. Before analysing such improvements in depth, the following picture (Picture 1) provides a complete overview of the process presented in this paper.

Picture 1 – The Italian organizational model to produce ENT data



3 Selection of the units of analysis balancing the demands of different statistical domains

From the SBR perspective, the new survey represents another statistical source to be used to set up the register and useful to define the structure and main characteristics of ENTs. The survey, or better the survey sample definition (which is described in the following paragraph), represents the main stakeholder to be considered when choosing a number of groups which is necessary to analyse in depth at national level and to contact directly to have specific information. In effect, data provided by administrative sources alone are not enough when the goal is the delimitation of ENTs and their main features; indeed, administrative sources are mainly based on the legal unit concept.

More specifically, the nSBR section is in charge of a set of preliminary activities which initiates the yearly process of profiling and the running of the RFI survey. Such activities are part of the so-called *mapping phase* which is crucial to classify and to select the groups that, considering national constraints and different user needs, should be manually investigated. In effect, in order to increase the coverage and accuracy of groups that are relevant for different statistical domains it is recommended that an appropriate strategy is followed in the choice of groups to be profiled manually, compared to those to be processed with an automatic procedure that makes only use of administrative sources. In short, the mapping phase is necessary to divide the whole population of active SBS groups in Italy in two parts: groups to be profiled through automatic algorithms and groups to be profiled manually and through statistical sources such as

the new RFI survey. Actually, the real number of groups to be manually investigated is also chosen on the basis of the number of profilers involved in the activity.

At this stage, two different sub-phases to handle the mapping action are envisaged:

1. a rather straightforward algorithm based on dimensional criteria;
2. a purposive choice made by expert profilers.

First of all, a set of automatic rules is applied to classify Italian groups according to their size and structure; in particular, such algorithm is based on dimensional criteria such as employment, assets and turnover thresholds³ and on an indicator called ‘Group Structure Type’.

This indicator is the result of the analysis on the degree of integration between the legal units and allows for a distinction between vertical, horizontal and diversified business groups. The ‘Group Structure Type’ indicator gives a measure of the complexity of the group structure, taking into account the number of legal units per group, the different levels in the chain of control and the presence of branches; according to this indicator, enterprise groups may be classified in vertical, horizontal and diversified business groups (matrix groups).⁴

The first part of the mapping phase results in the classification of enterprise groups in: small, medium, large and very large. In 2017 the majority of Italian SBS groups is small (79%) while very large groups represent only 0.1%.

Secondly, some qualitative information is taken into consideration to assist the choice. More specifically, two kinds of data are used, thus the complete list of Italian SBS groups is integrated with: (a) historical information regarding the last involvement of the groups themselves in international or national manual profiling; (b) priority rules of analysis provided to the BR by other statistical domains which may pursue

³ Groups are classified into small, medium, large and very large groups according to the criteria suggested in the UE Regulation 2013/34/UE Article 3 integrated with Eurostat classification for very large groups. The classification is based on the weight of three economic variables (employment, turnover and asset) considering only legal units resident in national territory.

Small groups - if any 2 of the 3 following conditions at national level are met:

Total Assets (at balance sheet date) ≤ 4 mln €
Net Turnover (for year) ≤ 8 mln €
Avg. No. of employees (for year) ≤ 50

Medium groups - if any 2 of the 3 following conditions at national level are met:

Total Assets (at balance sheet date) ≤ 20 mln €
Net Turnover (for year) ≤ 40 mln €
Avg. No. of employees (for year) ≤ 250

Large groups - if any 2 of the 3 following conditions at national level are met:

Total Assets (at balance sheet date) ≥ 20 mln €
Net Turnover (for year) ≥ 40 mln €
Avg. No. of employees (for year) ≥ 250

Very large groups - if any 2 of the 3 following conditions at national level are met:

Total Assets (at balance sheet date) ≥ 500 mln €
Net Turnover (for year) $\geq 1,000$ mln €
Avg. No. of employees (for year) $\geq 5,000$

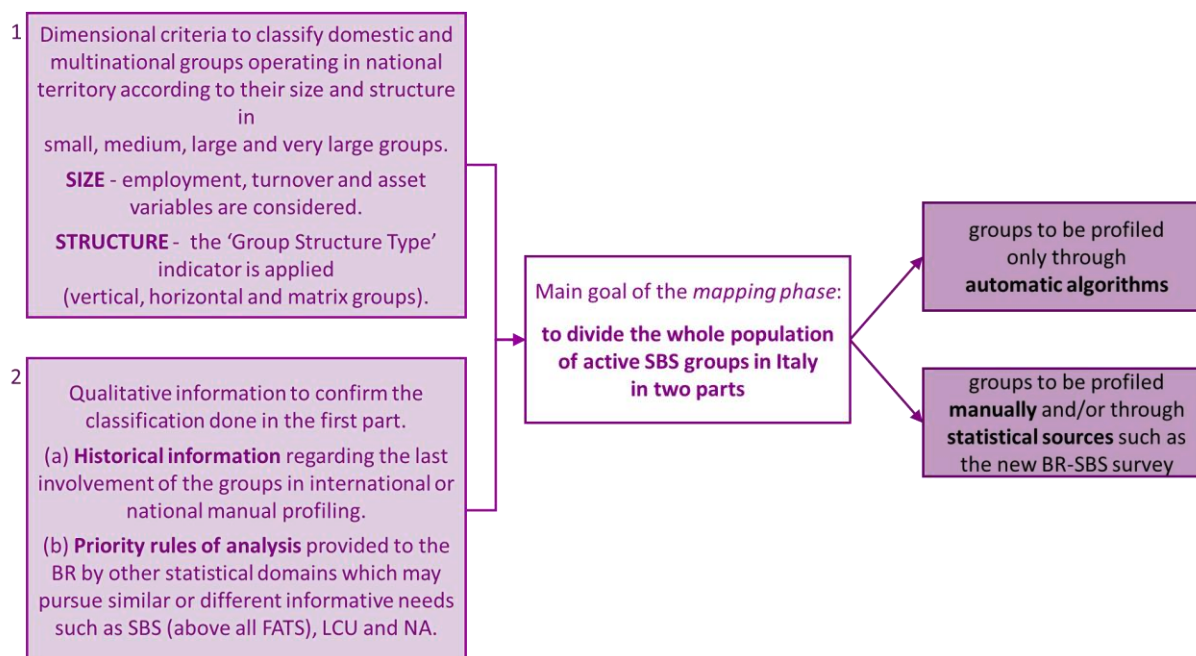
⁴ In **vertical** structured groups (or almost-vertical ones) different legal units run different phases of the production path so they may expand into diverse activities, known as upstream or downstream activities; **horizontal** integrated groups denote collections of firms operating the same or similar economic activities; **diversified or matrix** structures combine horizontally and vertically configurations.

similar or different informative needs such as SBS (above all FATS), Large Case Unit and National Accounts⁵ colleagues. The main goal is agreeing on the groups which need an in-depth study or for which a direct relationship is preferable, the latter in a “statistical burden reduction” perspective for the largest Italian MNEs.

The above priority rules have also been intended to select groups to be interviewed according to the economic sector in which they operate; in effect, it has been considered important to ensure a balance, in terms of number of groups, between manufacturing, trade and services industries and include in the sample also emerging sectors such as the digital economy one. For the above reasons, in some cases it has been requested to the EGR&Profiling Team to undertake a preliminary investigation on the business lines of specific MNEs by examining consolidated annual reports and financial statements as well as corporate websites. Usually, this second part of the mapping phase confirms the classification done through the first part so that the choice falls on groups which are large or very large.

The picture below (Picture 2) presents the mapping phase.

Picture 2 – The selection of groups to be analysed through automatic or manual activities



⁵ Istat, through a team formed by NA experts, LCU members and profilers has been recently working on “MNE Pilot Exercise in the context of the GNI”.

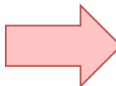
4 Provision of an *ad hoc* sample frame by leveraging profilers' skills and experimental automatic algorithms

One of the main innovations lies in the data collection process which is based on a new and *ad hoc* sample frame prepared by the Profiling&EGR team. In effect, the sample list is not a simple list of legal units with some specific characteristics such as the sector of economic activity in which it operates or the size in terms of turnover or employees; it is a list built on three dimensions: legal units, enterprises and enterprise groups. The observation unit is the enterprise group or part of it, the statistical unit under investigation is the enterprise and the reporting unit is a specific legal unit reporting for the entire group.

Once the groups to be included in the sample have been agreed with the different domains, a list of legal units belonging to each group has been provided together with the link with the relative enterprise. Since that the survey was intended to investigate reference year 2017, the sample frame was built on information referred to 2016 thanks to a pilot version of the Enterprise Business Register frame 2016 internally disseminated in May 2018. Such frame was built taking into account the results of international and national manual profiling activity and the application of national experimental profiling automatic algorithms.

This activity concerned 63 groups involving 1,218 legal units for a total of 721,283 employees, distributed by the following NACE macro-sectors: Agriculture, Industry, Trade, Services and Financial Activities. The profiling activity applied to these 63 groups has changed the structure of the groups themselves; by defining the new statistical unit ENT, it was possible to move from 1,218 legal units to 376 ENTs distributed as shown in Table 1.

Table 1 – **Distribution of LeUs⁶ and ENTs by macro-sector of activity**

AS IS				TO BE			
NACE sector	n. LeUs	n. Employees		NACE sector	n. ENTs	n. Employees	n. LeUs in ENTs
AGRICULTURE	5	83		AGRICULTURE	4	82	4
INDUSTRY	401	245,935		INDUSTRY	144	265,980	589
TRADE	155	74,802		TRADE	47	63,823	137
SERVICES	533	398,800		SERVICES	143	386,934	463
FINANCIAL ACTIVITIES	124	1,663		FINANCIAL ACTIVITIES	38	4,464	60
ALL	1,218	721,283	ALL	376	721,283	1,253	

In order to provide an updated frame of all legal units included in the Enterprise Register 2016 an integration with the live register has been taken on in order to remove liquidated legal units from the sample. Together with 2016 profiling results, such a list of legal units has been necessary to pre-fill the first section of the questionnaire on the validation of the group's perimeter and on the confirmation of the

⁶ The difference in the total number of legal units (1,218 in the 'as is' table *versus* 1,253 in the 'to be' one) is justified by the fact that when an enterprise contains a part of a legal unit so that the legal unit is split on more enterprises, the legal unit is repeated in the whole list of LeUs with the relative 'belonging percentage' to each of the ENTs; as a consequence it seems that after profiling activity the number of LeUs is increased.

combination of more legal units in an enterprise. If the BR section had not produced a snapshot of the Enterprise BR 2016, the *ad hoc* sample frame, important to start the survey, could not have been provided to SBS colleagues.

With regards to the responding unit, one of the legal units in the perimeter of each group has been chosen as the ‘responding unit for the whole group’; this choice was an important and decisive operation for the success of the investigation because it was in charge of all the data provided for the group in the enterprise breakdown. Taking into account that each questionnaire was intended to investigate more enterprises, such reporting unit was identified at the highest levels of the group. To elect a LeU as the reporting unit of the whole enterprise group some features have been considered: the level in the chain of control, the number of employees and the economic activity in which it is classified. In some cases, especially in diversified groups which operate through autonomous sub-holdings, it was necessary to recognise different reporting units, one for each macro-segment, and to prepare different questionnaires. All the useful information necessary to choose the responding unit has been prepared by the survey manager in close collaboration with the manager of the profiling team supported by the EGR&Profiling Team, who could provide an all-round analysis of the group to be interviewed by studying the latest available financial documents.

5 Monitoring survey responses having an active role in the survey data collection process

The active role played by BR and SBS profilers represents the main point of strength of the success of the operation. In particular, profilers have (a) fully supported respondents and (b) solved consistency errors and revised all questionnaires.

(a) Respondents support – Establishing and maintaining contacts with the largest national MNEs is a tricky process so it needs to be planned in the most suitable way and to be followed by a team of experts with a statistical and economical background (Alonzi and Marchettoni, 2018). As already explained in paragraph 2, in order to ensure full support to respondents, each duo of profilers (a BR expert and an SBS one) has been responsible for some groups; before the start (or in the early days) of the survey, profilers have carried on an in-depth study of their groups (desk analysis) with the objective of having a complete view of the legal, economic and organizational structure of them. Short reports have been prepared by the experts for each group under analysis in order to record all the information necessary to have a complete knowledge of the groups themselves: economic activities undertaken, main production sites, operating segments reported in the consolidated financial statements and available economic data, description of the ENTs as proposed in the questionnaire and waiting to be checked by the respondents. In a such a way, each profiler was able to offer suitable support and give adequate information and clarifications to the responding unit when compiling the questionnaire.

The section of the questionnaire for which the contribution of the BR experts has been mostly important, was the one concerning the legal and economic perimeter of the group (part 1 of the questionnaire). From a statistical point of view, the perimeter of an enterprise group is based on the concept of control which is somehow more extended than the consolidation area; most of the groups’ representatives needed explanations on this issue. In a similar way the proposed breakdown for ENTs, when differed from the

business lines depicted in the consolidated financial statements, requested detailed explanations to the groups' representatives by the BR experts.

In some cases, it has been necessary to organize call conferences and face-to-face interviews with the groups' representatives in order to better understand their economic vision compared to the requested statistical needs. Such contacts have reinforced the reliability of the Italian Directorate for Business Statistics since that the representatives of the major Italian enterprise groups have collaborated with highly skilled statisticians keen on economic issues. In this perspective the intra-flow transactions survey is not a traditional survey based on a usual questionnaire, but it may be seen as a modern interview to be carried out with the support of a guide questionnaire (Amante S. *et al.*, 2016) as a consequence of the high investment and involvement of all profilers.

Taking into account the variety and different features of Italian business groups, there is not a one-best-way to delineate ENTs and perform profiling activity. Consequently, and considering also that it was a pilot survey, when profilers were not confident in giving exhaustive answers to the groups, plenary sessions have been organised.

(b) Solving consistency errors and revision of questionnaires – During the entire data collection activity, after an initial phase of telephone contacts to the groups' representatives promoted by the experts to explain aims of the new survey as well as the main innovations introduced, there have been numerous interactions between the two actors (respondents and profilers).

Such fluid exchanges of information have enabled profilers to actively help the respondents understanding the statistical definition of the group's perimeter and structures of ENTs to be validated in the questionnaire and to update the BR with the information requested by the survey. Structural events occurred in the organization of the groups such as creation of new business lines caused by acquisition of new segments and reorganization of operative divisions within the groups themselves, or structural changes in the links of control (newly created legal units belonging to the perimeter of control but not consolidated in the reference year, liquidation or cessation of legal units during the period under examination) were the main topics addressed during such contacts.

The main role of the profilers was, in fact, to translate the profiling methodology that led to the definition of the proposed ENTs (names, structures in terms of legal units, NACE codes) into economic concepts that could be easily understood by the representatives of groups.

A synergic way of working not only between respondents of the group and statisticians but also between experts of the BR and SBS, was even more evident in the phase of revising the questionnaires. Inconsistencies in the data received both for the structural part of the questionnaire (perimeter and ENT structures) and for the economic part (economic flows organized by ENTs, with the intra-group flows removed) have been analysed jointly with SBS colleagues and the group has been contacted again if necessary; such interaction has been managed in an active and proactive manner.

Differently from traditional surveys, taking into account the innovative kind of survey and the almost modern statistical unit under investigation (ENT) the activity of checking and revising questionnaires has been done during the collection phase together with the respondents themselves. When necessary for a

better understanding of the data provided by the group, the duo of experts has contacted again the groups' representatives in order to make the validation of the questionnaire even more shared with the groups' data providers.

6 Producing new BR outputs by integrating respondents' returns

From the BR perspective, the pilot survey represents a new statistical source containing precious information on the unit structure and main variables suitable to feed the new Enterprise Register in accordance with EU definitions of statistical units. From a technical point of view the construction and maintenance process of the ENT register has not been industrialized yet because it needs an almost complete reengineering of the national statistical production processes. As a consequence, a set of operations have been undertaken as off-line processing. In particular, (a) a set of priority rules for the different sources of information has been determined, (b) an internal coherence plan between legal units, enterprises and enterprise groups has been developed in order to ensure high qualitative standards within the system of statistical business registers, and (c) a frozen version of the register has been provided.

(a) Sources of information – A set of priority rules for the different sources of information to build ENTs (reference year 2017) by combining legal units has been determined (the highest priority is indicated with number 1):

- 1) survey results
- 2) manual profiling
- 3) automatic profiling
- 4) 1 ENT = 1 LeU

In particular, for those groups involved in the survey (about 60 MNEs) which are respondent, the survey results have been acquired and integrated in the nSBR as the more reliable data. Some cases have been reanalysed by profilers in collaboration with the responding unit if the survey results have provided a picture on the economic structure of the group which differed from the desk analysis carried out in parallel by profilers. In a few cases, agreed among all the supervisors, answers from the responding unit have not been integrated in the BR.

Results deriving from the manual profiling activities have instead been considered as the most accurate data in the following situations:

- all groups involved in the survey sample⁷ but which were non-respondent units;
- groups which had not been included in the purposive sample of the survey, but which had been studied by expert profilers.

In all other cases, the ENT delineation, that is combining together more legal units, has been gained through experimental automatic algorithms developed by Istat and applied to all business groups in SBS scope. Such methodologies exploit the organizational structures of organizations distinguishing groups

⁷ For all MNEs involved in the survey an activity of manual profiling has been undertaken in parallel; such double-working had two different aims: making the training on the job of new profilers more effective and testing survey results during the first pilot edition of the survey itself.

with a mainly vertical structure and groups with predominantly horizontal structure from the groups with a matrix structure articulated both horizontally and vertically. In such a way, the groups' morphology, in an economic perspective, is the base for the statistical interpretation of the phenomenon (Alonzi and Migliardo, 2018).

Finally, for all remaining legal units belonging to groups of enterprises outside SBS scope, the 1:1 correspondence (1 ENT = 1 LeU) has been assumed. In such cases an enterprise consists only of one legal unit so that this legal unit corresponds to the enterprise.

(b) Internal coherence plan – Once the ENTs are defined through priority rules above described, they are analysed and checked. More specifically, an internal coherence plan between legal units, enterprises and enterprise groups has been developed in order to ensure high qualitative standards within the system of statistical business registers and release a BR frozen frame for ENTs. Up to now this plan concerns ENTs manually profiled (priority 1 and 2) which are less controlled than ENTs generated through automatic procedures. Since that first steps toward the complete industrialization of the updating process of ENTs and the management of ENT-LeUs links are still ongoing, to facilitate the edit and imputation procedures, all links between legal units, enterprises and groups have been uploaded in an Access Database (a file with the extension .accdb). Such repository, developed in-house by the members of the EGR&Profiling Team, is called APE (Access Prototype ENT) and is used to store data on Italian ENTs as well as to keep information on the links between the legal units and economic values of the ENTs themselves. At the same time, working on APE, BR statisticians have carried out a feasibility study for the integration of the ENT-module in the already existing nSBR system of groups and legal units and they have defined *ad hoc* specifications for the IT specialists for the future necessary industrialization of this updating process.

In order to guarantee coherence between the different statistical units, the provisional ENT frame generated through APE, is compared with the provisional (or final if available) frame of the BR of Enterprise Groups for the set of groups manually profiled. The goal is ensuring the following quality standards: (1) all the legal units belonging to a group and correctly updated in the nSBR of EGs have been included in APE, too; (2) all the legal units included in an APE file are part of the same group in the nSBR of EGs; (3) profilers have assigned the whole economic percentage (100%) of a legal unit to one or more ENTs of the same group.

Once all the inconsistencies in the statistical base of LeUs and ENTs are solved, some of the mandatory variables, estimated by profilers, are checked. More specifically, the NACE code represents one of the most important attributes of the ENT because it implies different methods of consolidating economic variables from the SBS side. For example, the coherence between the principal NACE code of each ENT and the NACE codes of all the legal units belonging to the same ENT has been ensured; the main hypothesis is that an ENT inherits the NACE code of the 'the representative unit'. The representative unit concept, conceived by the Italian EGR-Profiling Team, is the legal unit, inside an ENT, carrying out the principal economic activity measured in terms of economic variables such as value added, turnover and number of persons employed.

(c) Dissemination – A frozen frame of the BR of ENTs (reference year 2017) has been produced and disseminated to internal users. Such release has been indispensable especially for SBS domains to allow

SBS experts to estimate economic data on the structure and performance of enterprises for the new statistical unit ENT, thus meeting the deadline granted by Eurostat in the Italian action plan SBS⁸. In this way, the nSBR has fulfilled its backbone role for the production of economic statistics.

In order to provide an almost complete picture of the register snapshot made available by the BR Section the different output files are presented. More specifically, to support SBS estimation and consolidation process, two main outputs have been produced: in the first one the key unit is the legal unit while the second one only contains ENTs.

1. **LeUs-ENTs relationships** – Such frame consists of all the legal units belonging to an enterprise group and the relationship with the ENTs. In case an enterprise contains a part of a legal unit so that the legal unit is split on more enterprises, the legal unit is repeated in the list with the relative ‘belonging percentage’ to each of the ENTs. More specifically, this dataset contains the following information: LeU identification number, ENT identification number, Group identification number and the belonging percentage of each legal unit to one or more ENTs (if the legal unit belongs only to an ENT, such percentage is equal to 100%). In case of ENTs defined through automatic procedures and not investigated by the survey, the output is enriched by a set of indicators which are necessary for the automatic consolidation process of non-additive SBS variables; these indicators test possible relationships between the ENT main economic activity (in terms of NACE code) and ancillary and vertical integrated activities within the ENT itself considered two at a time and based on economic thresholds.
2. **Active ENTs** – Directly derived from the first frame, the second file represents the list of all active enterprises (reference year 2017) with its main characteristics such as the principal activity code and the number of employees. Information on the number of legal unit(s) of which the enterprise consists is given, too.

7 Conclusions and future developments

This contribution has presented the BR experience and more specifically, Italian best practices on how the SBR is able to fulfill its backbone role for the production of economic statistics, providing all the information needed by the statisticians who are responsible for the various economic surveys and related statistical processes and outputs (UNECE, 2015). Besides the innovative way of working, the following innovations have been described: the BR activity to select the units of analysis balancing the demands of different statistical domains, the provision of the sample by leveraging profilers’ skills and experimental automatic algorithms, the complete involvement of the BR staff in supporting respondents, monitoring

⁸ In May 2015 Eurostat concluded that the compliance fell short of the requirements of the SBS Regulation No. 295/2008 in several Member States and asked them to take appropriate measures in order to guarantee that the correct implementation of the statistical unit "enterprise" in the domain of SBS was applied. In particular, in case a Member State was not able to ensure the full compliance within two months (by 13 July 2015), Eurostat encouraged it to set up an action plan, explaining how the full compliance could be reached in the near future. Consequently, many countries defined an action plan to be compliance with Council Regulation (EEC) No 696/93 and Regulation (EC) No 295/2008 of the European Parliament and of the Council. The **Italian action plan** sent to Eurostat in June 2016 provided basic and analytical information for the production of SBS estimates with reference year 2017 by June 2019.

survey results and checking respondents' entries, and the internal dissemination of new outputs by integrating survey answers and providing a backbone for SBS non-additive variables.

Different obstacles as well as strengths of this new model have been identified; however, they have to be read in a double perspective: each weakness, such as rigidity to change, may become a strength, depending on the level of integration between the different activities. Overall, the innovative organizational model aims at guaranteeing the achievement of higher quality levels in global statistics as well as the rationalization of business statistics production processes. Picture 3 presents the main keywords related to the Italian profiler role in the form of a word cloud built on a world picture as to represent globalization; strengths and weaknesses are pointed out together with issues regarding the profiling process and the new model of work jointly developed by the Italian BR and SBS sections.

Picture 3 – **The Italian profiler role: strengths, weaknesses and process keywords**



Looking for a full horizontal integration of knowledge, skills and tasks, the Italian team of expert profilers has been joined by a group of SBS statisticians and, together, they have run a new statistical survey on intra-flow transactions within groups of enterprises. The new survey (pilot edition 2017) has reached about 90% response rate and has been positively appreciated by complex enterprises. When compiling the survey, respondents could count on a double support; in effect, they were able to contact different skilled profilers depending on the issue: if they had questions on the first part of the questionnaire, that is the delineation of the ENT structure, they could contact the BR expert but if they had problems in filling in the second part of the questionnaire they could reach the SBS expert. However, both the profilers were competent on the group's analysis and had previously studied the organization of the group itself as well as the main corporate documents.

In additional, profilers' feedbacks (short reports on each group have been prepared by all couples of profilers in order to document all best practices and main problems), will be used to improve the quality

of the survey. Fully operational, the goal will be to align the survey with the timing of the BR and to increase the number of groups to be interviewed.

The above presentation on the integration between the RFI survey results and the nSBR, far from being exhaustive, represents a first attempt to organize data on ENTs in a more structured way, both from a statistical and methodological point of view and from an IT perspective by systematizing all lessons learned in the latest years when Italy has been involved in international profiling activity with the aim of facilitating coherence in international but also national statistics.

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