



## **A Business Architecture Model to support the Modernisation Project within the Italian National Institute of Statistics - Istat**

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### **Abstract**

Fast technological developments and rapidly growing availability of new data sources offer new opportunities to increase effectiveness and efficiency of both the production of official statistics and the dissemination of statistical products.

However, official statistics organisations are often internally characterised by lack of language homogeneity and a variety of organisational approaches that make the dynamics of change expensive and complex. For these reasons, the Italian National Institute of Statistics (Istat) decided to adopt a Business Architecture (BA) model aligned to others developed at international level, in order to optimise processes and make them more efficient within its modernisation project. The BA makes use of a generic Activity Model (composed of four BA business lines and their inner activities), of a BA process flow, of a set of principles and defines corporate infrastructures.

This model represents the foundation fostering and intensifying the definition of a common vision also at European/International Statistical System level.

**Keywords:** standardisation; process optimisation; organisational changes; official statistics.

### **1. Introduction**

In the last decade, official statistics have undergone a dramatic shift both in the production model and in its output. The traditional chain, based on the vertical integration of different survey-specific tasks carried out to collect, process, analyse and disseminate statistical data, has become outdated. Together with many other statistical institutes in the world, Istat is moving from a stovepipe model to a new structure consistent with the industrialisation and standardisation of production processes. The new business model enhances productivity, improves efficiency and effectiveness, supports better quality control and allows for quicker innovations.

Presently, official statistical organisations often tend to introduce different organisational models internally, instead of referring to a unique one at the enterprise level. In this framework, Istat internal structure does not appear the most suitable to enhance integration and efficiency since it is based on separated Departments replicating cross-cutting functions (technical and even administrative) with a high autonomy even at strategic level. This represents a kind of *silo* model characterised by strong heterogeneity (of procedural, methodological and technological approaches), lack of standards and redundancy of data and applications. The use of different vocabularies and terminologies sometimes can lead to conflicting descriptions of the same entities. These lack of homogeneity of language and flaws in the organisational approach make the dynamics of change expensive and complex and draws the attention to the importance of achieving a unity of views, so that each part of the organisation can undertake a work of innovation consistent with the objectives that should be realised.



Istat modernisation programme started in September 2014 and entails structural changes in the working environment and in its technological and methodological foundations. For instance, on the one hand traditional data collection based on sample surveys and censuses carried out on population units of interest directly (households, individuals and businesses) are under discussion because of their cost, response burden, and decreasing response rates. On the other hand, the only sensible alternative is represented by the use of statistical registers, mainly derived from administrative sources, to be maintained and updated on a continuous basis.

Within this context, Istat adopted a generic Business Architecture (BA) model which is called to play a central role in the modernisation programme of statistical information production: this model (aligned to other models developed at international level) among other advantages can also represent a common language enabling to conceptualise both the present situation (*as is*) and the future one to be reached at the end of the evolution process (*to be*). The description of the two states (present and future) also allows to identify a path towards possible changes in a more rational and measurable way, defining specific actions involving different skills that need to interact within a shared view of a tangible progress. Consequently, the BA model provides an important support to an integrated and well-organised implementation of all the useful and necessary innovations, sharable and adoptable also by other National Statistical Institutes (NSIs).

The modernisation project has been defined with the aim to:

- accelerate the evolution of the production processes, rapidly adapting them to the changing environment and new technologies;
- realise a more agile organisational structure, oriented to flexibility and efficiency, in order to support the change effectively and replace the current *silo* model;
- build a sound governance mechanism more suitable to respond promptly to the Institute strategy implementation.

In the following paragraphs, first Istat modernisation project is outlined, then the Business Architecture model is illustrated particularly with regard to what is directly functional to the implementation of this internal process of change.

## 2. Istat modernisation project

The new organisational structure is compliant with Istat Business Architecture and with the statistical register model, and is based on three main elements:

- production modelled on registers derived from administrative sources;
- centralised corporate support services;
- sound and well-structured governance.

It is divided into two main areas: statistical production and centralised corporate support services (see also Giorgio Alleva's scientific contribution in *IPS023* of this Congress).

The production area is responsible for the whole production process of the statistical information to be disseminated. In particular, it is responsible for the register system creation and maintenance as well as for its integration with data collected by means of statistical surveys. Actually, this responsibility is shared with the corporate support service area, with regard to data collection, IT and methodological aspects.

The corporate support service area provides all the necessary centralised services for the production area. It is subdivided into two main groups, one dealing with specialised support (methodology, IT, data collection and dissemination) and more related to the production processes, the other one dealing with more general and legal support (management/administration). It represents the Institute *operating machine* with tasks regulated both by Service Level Agreements and by Operational Level Agreements, so as to ensure a clear identification of different and shared responsibilities.

Each area pursues research and innovation aimed at self-improvements that are essential to ensure the system evolution and its ability to address new challenges. The overall activities are chosen on a corporate basis through a portfolio and project management approach shared by the whole Institute.

As a consequence, the internal process organisation is based on (i) the Business Architecture model, (ii) the use of registers derived mainly from administrative sources but also integrated by surveys and (iii) a structure guided by an industrial approach with a strong standardisation of processes.

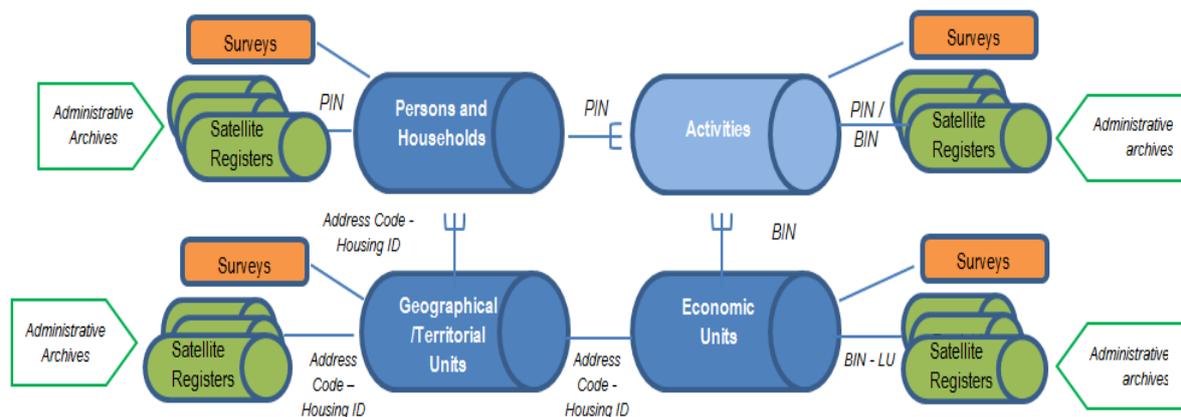
The first element (the BA model) is illustrated in the next paragraph.

The second represents a fundamental reference for Istat modernisation project and is based on the statistical register system, consisting of base statistical registers and connected satellite registers. More specifically, it is a coherent and integrated system of three base statistical registers linked together, each relating to a different type of statistical unit on which is based the official data production:

- persons and households;
- economic units;
- geographical/territorial units.

This system requires that these three base registers are supplied partly by surveys and mainly by other administrative archives (collected in satellite registers) with which they interface continuously. These registers communicate with each other and with a fourth base register that is related to activities and originates the so called *Linked Employer-Employee Dataset (LEED)* as illustrated in Figure 1. From the system architecture point of view, the register of activities has the function to mediate the *many to many* links between the person and household register and the economic unit register, turning them into two *one to many* relations managed by relational databases.

Figure 1 – The statistical register system



Legend: Link one to many —E; BIN = Business ID Number; PIN = Personal ID number; LU = Local Unit

Source: Wallgren e Wallgren, 2013

Finally, the third element (industrialisation of process) requires process standardisation as a prerequisite and is guided by the BA model that plays a fundamental role also for this aspect.

### 3. The Business Architecture model

Istat adopted the BA model and made it operational by considering its twofold role played in the standardisation and modernisation processes. On the one hand, the BA model fosters and orientates the activities required to pass from the *as is* to the *to be* situation that is finalised towards modernisation and standardisation, both from an organisational and a production-related point of view. On the other hand, each activity included in the different BA business lines naturally points to standards which should be used to facilitate the process of transition to modernisation.

At European and international level, Istat is actively contributing to the development of a generalised BA model. More specifically, the model adopted by Istat is the result of the activities conducted within



the Statistical Network BA Project Team<sup>1</sup> and various ESSnets on Standardisation<sup>2</sup> and is completely aligned with the current version of the Generic Statistical Business Process Model (GSBPM 5.0). It represented also the basis for the development of the Generic Activity Model for Statistical Organisations (GAMSO) by the High-level Group for the Modernisation of Statistical Production and Services of the United Nations Economic Commission for Europe (UNECE).

The BA is a part of the more general framework represented by the Enterprise Architecture (EA), which identifies the different elements that make up the enterprise and the ways in which they interact with each other, providing a clear, coherent and feasible picture of what is necessary in order to achieve the expected goals. More specifically, the EA can be divided into four different architectural layers (Business, Information, Application and Technology Architectures). In this framework, the BA can be considered as the strategic layer of the EA, playing a central role in a programme of change and modernisation.

Istat BA model makes use of a generic Activity Model, of a BA process flow, of a set of principles and defines corporate infrastructures.

The BA Activity Model specifies four areas called Business Lines (BLs) that are homogeneous with respect to their inner activities and are defined so as to ensure the independence of the organisational structures as well as their stability with respect to future reorganisations. Each BL is characterised by specific groups of activities, in turn divided into individual actions. BLs favour harmonisation and standardisation and leads to overcoming the heterogeneity of procedural, methodological and technological solutions, also supporting the adoption of standards and ensuring the minimisation of redundancies in data and applications.

In more detail, the Business Lines are (see the process flow conceptual scheme illustrated in Figure 2 and produced using the *Archimate* notation<sup>3</sup>):

1. *Strategy* that defines the Institute vision, concerning its internal and external environment and in a future perspective, leading the activities of the project and portfolio management in line with the needs of national and international stakeholders;
2. *Corporate Support* that covers non-statistical and cross-cutting functions;
3. *Capability* that handles the development and management of the necessary elements and enablers (in terms of methods, procedures, standards, systems and IT skills) in order to make operational the activities of the other BLs; it promotes also the sharing and reuse of statistical products through infrastructures (mainly repositories) that facilitate the harmonisation and consistency (e.g. the repositories of Skills of Human Resources, of Data and Metadata, of Methods and Guidelines, of IT Tools and Applications);
4. *Production* that deals with the statistical production processes in harmony with the directives defined by the *Strategy*, using the resources made available by the *Corporate Support* and *Capability*.

The conceptual scheme illustrates the overall framework and the iterative nature of the flow that is based on the reuse of the different processes: all the BA business lines are shown with all their inner groupings of activities (levels 1 and 2), while only a few single specific activities are included (level 3). The process starts with an analysis of the information needs that originate directly from stakeholders and other users. This generates a business case to be evaluated within *Strategy* so as to decide whether and how to modify the current statistical portfolio. This business line includes activities such as portfolio and project management that deals with the selection of projects. Choices regarding the selection, and priority to be given to the different projects, should be guided also by the use that such projects make of standards or by the fact that they are standards themselves. It refers to

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<sup>1</sup> It included a number of important Statistical Institutes (such as Australia, Canada, Italy, New Zealand, Norway, United Kingdom) and worked on the definition of a common model for the official statistical community. From the beginning of 2015, its activities were transferred within the UNECE High-level Group for the Modernisation of Statistical Production and Services.

<sup>2</sup> The most recent activities were coordinated by the Hungarian Central Statistical Office (HCSO) and were carried out by NSIs of France, Hungary, Italy, Latvia, Lithuania, Netherlands, United Kingdom.

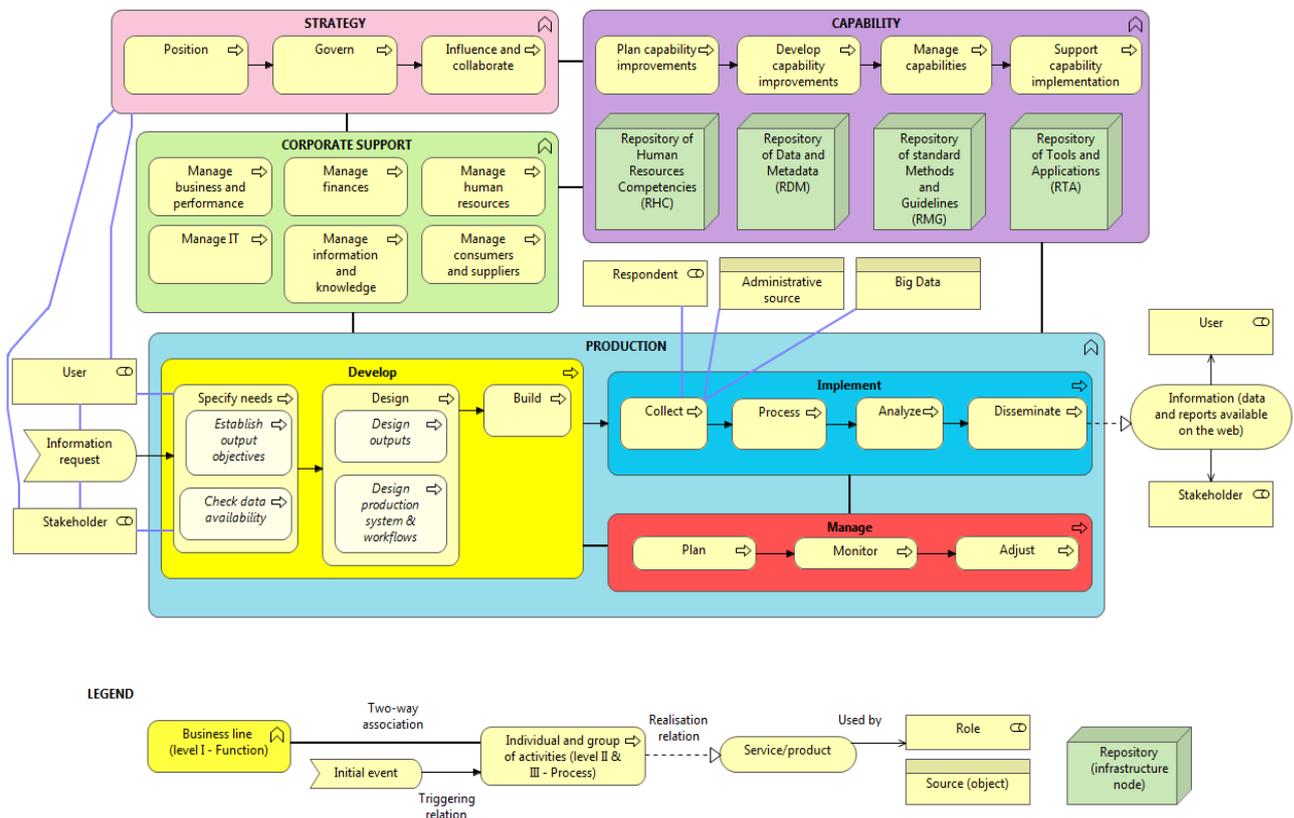
<sup>3</sup> [www.archimatetool.com](http://www.archimatetool.com).

portfolio management of both standards and other capabilities as well: this is a crucial activity in order to optimise the effort towards standardisation.

At this stage *Corporate Support* and *Capability* activities are organised in order to guarantee the setup of all the necessary services. Human resource competencies are among the most relevant capabilities that underpin an organisation ability to conduct its business. Such competencies should be defined on the basis of the organisation Business Architecture activity model: associating competencies to each action or process can help to identify competency gaps in an organisation. In this framework, Istat future challenges include finding and developing new skills relating to increasingly complex knowledge demands and to new data sources such as big data, as well as adapting them to the growing use and integration of administrative data in statistical registers. Also essential is ensuring the Institute employees are well trained to meet the need for high quality, timely, and cost-effective data and to face the new challenges ensuing from modernisation and organisational change, through both managerial and specialised skill development.

The process ends with providing information and results to stakeholders and users.

Figure 2 – The Business Architecture process flow conceptual scheme



Source: ESSnet on Standardisation – SGA-2, 2015.

Istat BA model is also driven by fundamental principles, which become real guidelines for the activities contained in the BLs, and can be classified into two groups:

- seven decision principles which guide the activities of strategic planning;
- nine design principles which guide the design of production processes.

Some principles are particularly important and highlight that *the whole statistical process is driven by output and metadata*. All the various aspects that characterise the process, indeed, are defined by starting to consider the required final products, working backward (see Figure 2). The metadata derived from the design represent the reference for the production process implementation. In general, it is necessary that metadata are accessible and standardised as far as possible, with regard to types of



units, definition of concepts, classifications, characteristics of quality, process, etc. Another key element is represented by the reuse of data, metadata, methods, tools and applications. With regard to data, the use of existing available data is always to be preferred instead of carrying out a new survey. For what concerns applications, reuse is facilitated by the adoption of modular services that can be shared in different contexts and statistical areas (following a Service-Oriented Architecture approach), while the development from scratch is to be considered a real exception. Finally, the *industrialisation of statistical processes* is always to be supported in order to ensure independence between design and implementation.

#### 4. Concluding remarks

The evolution of Istat organisational model in the sense of its modernisation is mainly justified by the need of meeting user needs in an environment where new technologies have rewritten the rules of production and communication, posing new and demanding challenges to the NSIs.

In Istat modernisation project, the adoption of a clearly defined Business Architecture played a crucial role. A shared Business Architecture model is strongly recommended indeed, as it clearly defines the *to be* situation characterised by a high standardisation of processes while maintaining a flexible and non-bureaucratic structure.

The BA model is made fully operational through a road map properly designed and scheduled, focusing particularly on the implementation of some of the basic infrastructures provided, both in terms of procedures (such as the management of the *portfolio* of projects, the compliance assessment of the several statistical production processes with the BA principles, and the consequent validation) and in terms of shared services. This involves necessarily an active participation in broader initiatives aiming at increasing integration at national, European and international level, so that this conceptual model may become a common reference for the whole official statistical community.

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