Business Process Reengineering aimed to re-design a statistical production process: a case study the “new interviewers' network”

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Abstract: Due to the new reorganization of “Labour Force Survey (LFS) ISTAT is working for reengineering the data collection process. The main purpose of this paper is to present the methods and technique used to obtain 1. the formal design of the new labour force survey process by the Action Workflow Analysis (AWA); 2. the structured project of information systems supporting the new process. AWA is used for first to define, understand and communicate the way in which the old processes work and then to design the way the new processes could or should work. By the integration of AWA with Business Process Reengineering (BPR) methods and Information Engineering tools we have achieved in modelling a system oriented to perform an optimized data collection process by right technological and organizational choices and to deploy a system aimed to control and monitoring the process..

Keywords: statistical production process, process modelling, workflow analysis, business process reengineering, information engineering.

1. Introduction

In the "vision process" ISTAT has applied a group of innovative methodologies and technologies to design and deploy the new continuous Labour Force Survey (LFS). In order to fulfil the requirements of the new Regulation on the organisation of the EU LFS, evaluating the complexity of this transition from the organisational and technological viewpoints, ISTAT has been recognised the need to apply project method belonging to business process reengineering, total quality management e process continuous improvement[3][5]. In particular the main area of application used has been the process analysis (AWA) like baseline to project and deploy the operational, monitoring and control information system able to provide a "whole view of the statistical production process from the data collection phase to the data processing phase". The methodology we have defined has been built by the combination of different tools. The purpose of next chapter is to describe the steps and activity we have realised to get the "basic system model" for the new continuous LFS.

2. The new continuous Labour Force Survey

ISTAT has recently undertaken a comprehensive project in order to fulfil the requirements of the new Regulation on the organisation of the EU LFS, adopted in 1998.
The topics of the new Regulation are:

- the switch from a single reference week to a continuous survey;
- the redesign of the questionnaire; the elimination of the opening question on main activity; adoption of a probing approach with a clear definition of the time reference; introduction of multiple questions to include persons with a job but not at work in the reference week and unpaid family worker; introduction of hints on casual jobs, and on the distinction between paid work and voluntary work;
- a new sampling design: apart from some big cities adopting a proper continuous framework, each sampled municipality will be associated to a reference week and all the municipalities in each stratum will be allocated to the 13 weeks of a quarter. In this way the same municipality will be covered in the same week each quarter[1][4].

Rise to the occasion ISTAT decided to Reengineering the LFS process to eliminate the critical points of current survey. Until now ISTAT has left the organisation of the field work to the municipality statistical offices. As a consequence, nearly the 70% of field staff is formed by people who carry out interviews as a secondary job and the possibilities of selecting interviewers and of monitoring filed work by ISTAT are rather limited. To sum up the critical points carried out are:

- the interviewer skills;
- the heterogeneity of relationships between ISTAT and interviewers;
- the difficulties to control the global data collection process connected with the field work quality.

The main solutions adopted to succeed in developing the new survey process will be:

- a new organisation of the field work: face to face interviews will be carried out by a limited number of professional interviewers recruited directly by ISTAT and regularly monitored by ISTAT regional supervisors;
- the adoption of a new data collection system: households will be interviewed face to face with the help of personal computers at their first inclusion in the survey (computer aided personal interview CAPI) and by telephone if possible, in the recall interviews (computer aided telephone interview CATI). Households not contactable by telephone will be visited again at their address.

At the moment ISTAT has projected the information system supporting the new process and is working for implementing it. In the next chapters we are going to present the main steps followed to design the process information system and the process analysis methodology (Action Workflow Analysis - AWA)[1].

3. The project steps

The methodology we followed is framed in the business process reengineering (BPR)[3][5]. The major emphasis of this approach is to focalise the attention on the process before applying information engineering tools. In the classic perspective the goal of implementation of an information system was to automate routine tasks. In the "process vision" the goal is to project and implement a "whole system" in every and each components: organisation, agreements between people and technologies .

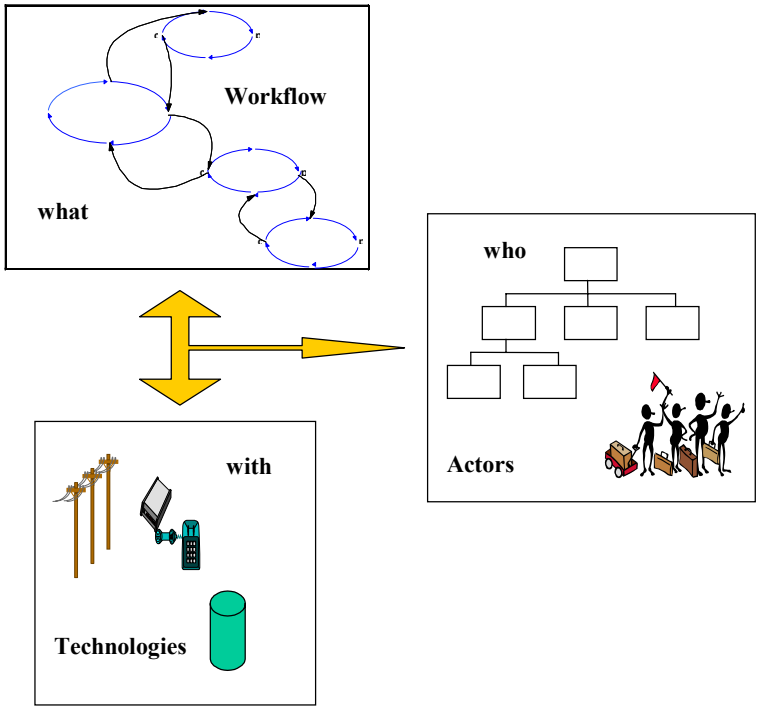

Figure 1

Following this approach we aim to avoid the classical project mistakes like firstly not fulfilling user requirements, secondly not deploying a comprehensive information system with all components and finally developing unnecessary subsystem.
The methodological steps followed to obtain the project of the system have been:

1. A description of the AS-IS condition: the focal point of this phase has been the design of current survey, the assessment of the execution time and the skills of actors involved in the process, the bottlenecks of AS-IS condition and the critical points[3][5][7][8][9].

2. A formal preliminary description of the TO-BE condition: the focal point has been the identification of the boundaries of BPR project, the strategic context (internal and external constraints) and the skeleton design of the new process by AWA [3][5][7][8][9]:

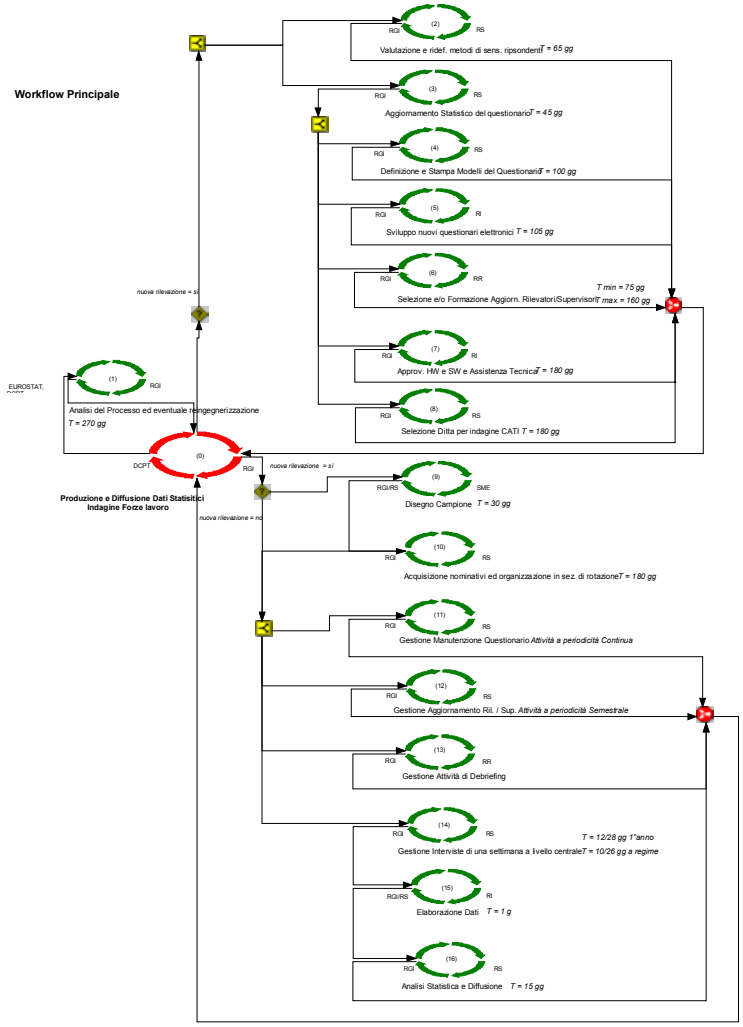

Figure 2 – The Skeleton of LFS Process

3. A detailed analysis of component processes: we have described each secondary process in nine steps. Each of them allows pointing out a different process aspect so that anyone could have at the same time detailed and global process vision. The first seven steps are descriptive analysis. On the contrary the last two are more technical.

3.1. Concise description: process is a global view of activities. Whit this step we explained the meaning of each of them;
3.2. The representation (the map): the aim of this step is to point out the links between the activities in order that the business management can be understood;
3.3. The process roles: the goal of this step is to show the foremanship;
3.4. Execution time table: the table object is to underline the process and activity length, the beginning and the due date, the system warning contents and their dates.
3.5. Monitoring function: for each process the actors are provided of one or more functions to follow the process state. This section describes these functions. The table structure presents the monitoring actor abbreviation and the data which could been used to control the process
3.6.Report: report functions could been used to weight the process performance. In this section we can found some of evaluations could been elaborated. The table structure presents the report concise description, the data search and the report result
3.7. Performance indicator: these functions are like reports but their specificity is the attention to the time. Through this we could evaluate if the process length and the beginning and the due date are or not correct. The table presents an indicator description, the estimated value and the calculated value of the indicator.
3.8. Process table: the table highlights the activity pre – condition and post – condition, the critical situation to control and the action required to control the critical situation:
3.9. Function description: this section was been dedicated to describe the functions of data processing in the classical way of software development.

4. A re-assembling of the secondary processes: in order to obtain a complete vision and design of the new global process we have re-designed the main process supporting continuos LFS. In the phase we have applied a kind of BPR method to the project. In other words, having deepened the process details, it was possible to simulate the new organisation of main process and we were allowed to understand the TO-BE process defects and to reengineer it. The final result has been the following process model[5][7][9]:

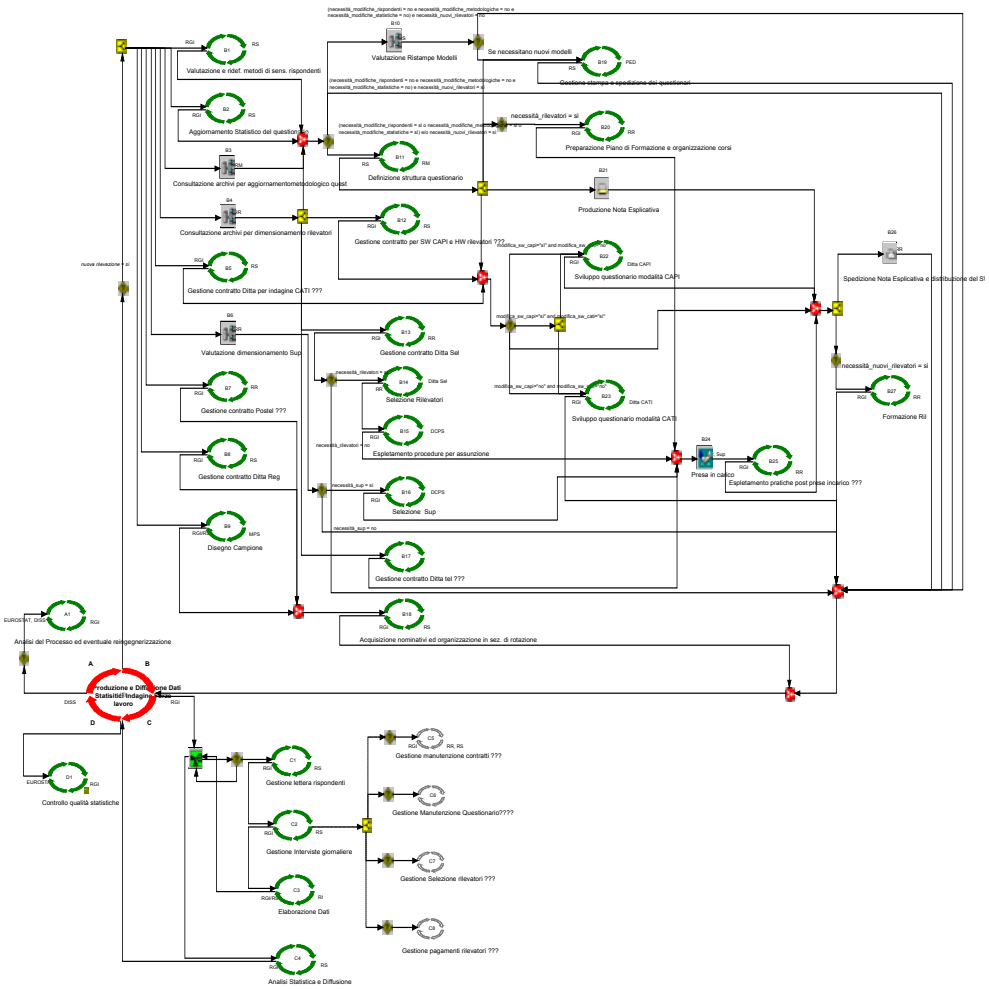

Figure 3 – LFS Process

5. A definition of information system supporting the process: the main activity of this step has been the function and data model supporting the process. This modelling has been conducted by the integration of process analysis AWA with the structured information system analysis (data flow diagram and entity-relationship diagram). The result has been the identification of the information systems and the structured knowledge of the systems for managing each process and, on the contrary, of the process supported by each system[5][6].

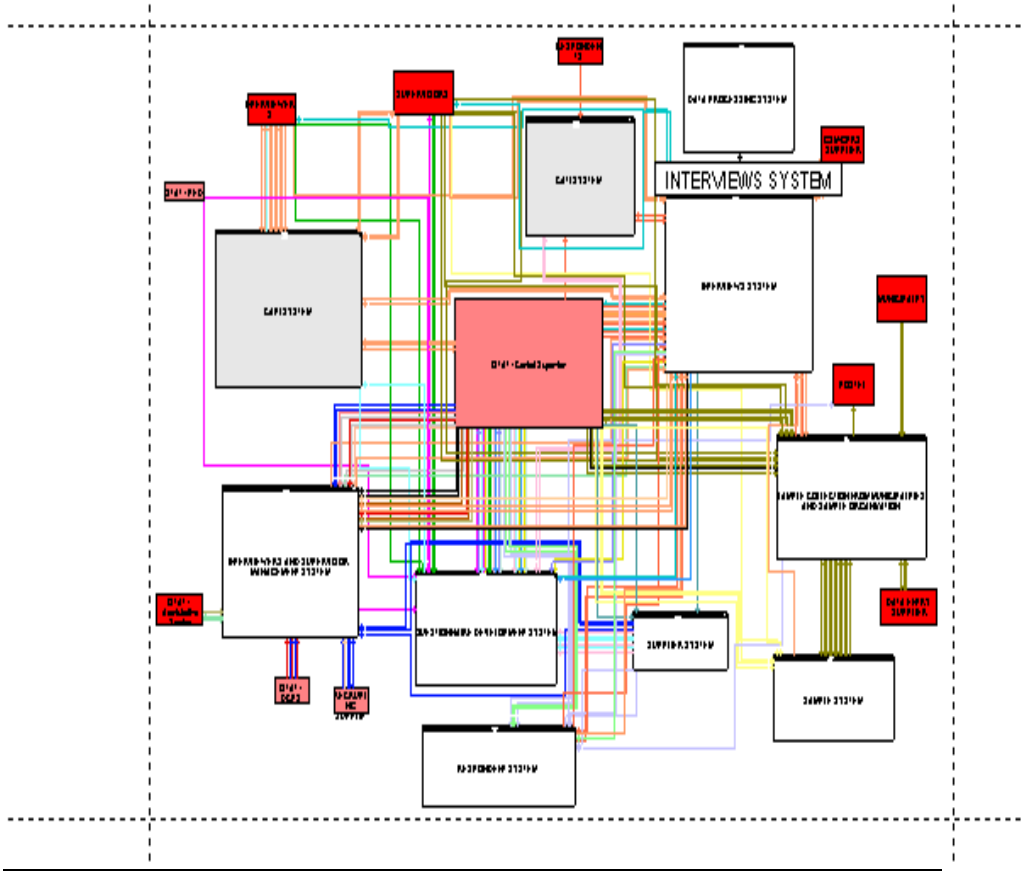

Figure 4 – Information System Supporting LFS Process

6. A definition of the architectural model: the purpose of this phase has been the choice of the right technologies supporting the process requirements. Every choice has been decided to optimise the global cost, the delivery time and the integration between different system components[2][5][6].

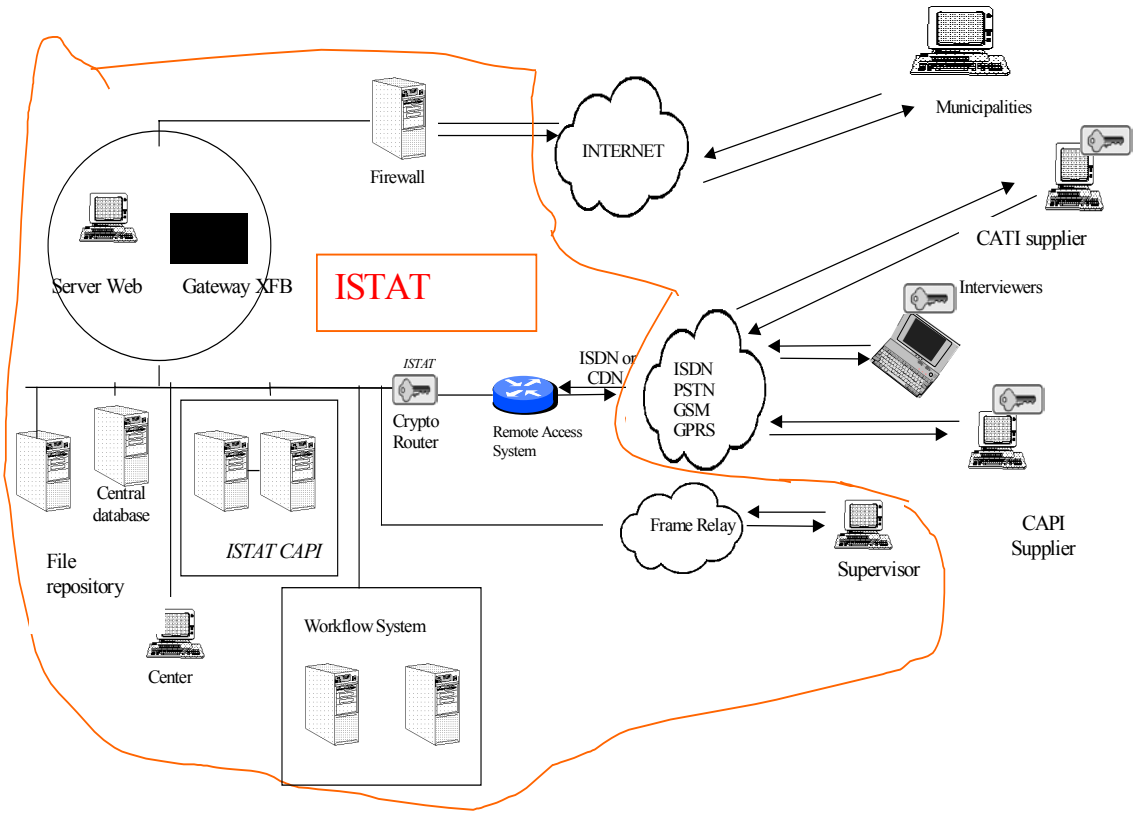

Figure 5 – Architectural Model

4. Action Workflow Analysis

In order to design the new process for LFS, associated data and information needs, we have applied the Action Workflow Analysis (AWA) .
The design methodology focuses on the agreements between people. It shows the structures of agreements between people to produce customer satisfaction. The methodology classifies all units of work into workflows, and identifies for each workflow, a performer who is doing work for a customer. Each workflow unit is graphically represented as a workflow loop. Processes can be modelled as a series of workflows, with different

participants assigned the roles of customer, performer, and observers within each workflow[7][8][9][11].
Each workflow is divided into the four phases in which customers and performers coordinate with each other:
Preparation
The customer or performer proposes work to be performed by the performer
Agreement
The customer and performer come to agreement about the work to be performed
Performance
The performer performs the work and declares that it is complete
Acceptance
The customer evaluates the work and declares satisfaction

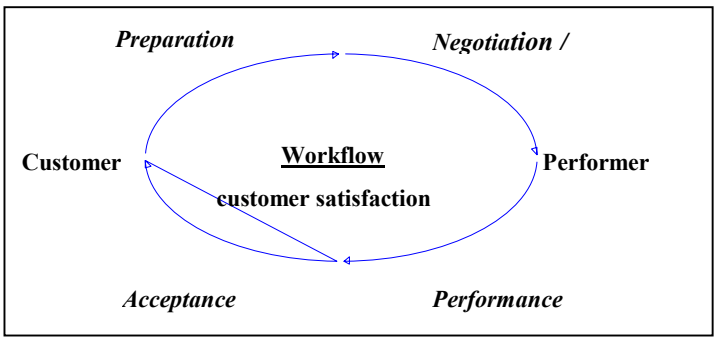

Figure 6

The first phase is preparation, in which the customer prepares to ask for something, often, for example, by filling out a form or preparing an e-mail message. When the customer asks for something, the workflow enters a phase of negotiation, in which the customer and performer agree on the work to be performed, clarifying what are termed the conditions of satisfaction. Once this agreement has happened, the workflow enters the phase of performance, in which the work is done and the performer declares that the work is complete. The workflow enters then a final, critical, acceptance phase, in which the customer either reports satisfaction or dissatisfaction with the work[7][8][9].
Most business processes are made up of many workflows, and the workflows are connected. The relationships among workflows are represented by putting all of a business process workflows on a map, and drawing links between them indicating what phase in a parent workflow kicks off a sub-workflow. Maps create a common graphical language that collects all stages of process automation, from the early stage of analysis and design through to development and application deployment[7][8][9].

5. Conclusion

At the moment the "basic system model" we have projected is in the implementation phase. The most difficult task is the integration between CAPI and CATI systems with our production information system. Besides, in order to control a so complex system we are

implementing a Workflow System (WS) based on AWA. Workflow is concerned with the automation of processes. Information and tasks are passed between process actors according to a defined set of rules to achieve in managing the whole process. Whilst workflow may be manually organised, in practice most workflow is normally organised within the context of an IT system to provide computerised support for the process automation and it is to this area our basic system model is directed[10]. The system is not a "pure workflow" but it has been imagined like an integrated system composed by a CAPI system, a CATI system, an interviewers/supervisors ERP system, a respondents management system, a central database for the management of interrelation among different information flows incoming from CAPI and CATI system and data processing system. All these operational systems will be coordinated by the Workflow System.
The result we want to achieve, in this way, is a system that deploys the interrelation between process, activities and information systems producing together statistical indicators for LFS. The applied methods should help us to assess performance of the "system as a whole"[5].

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