**A matrix model for human resource organization to improve effectiveness and efficiency in official statistics**

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**Abstract**

*Quality does not only mean quality of products, services, processes and methodologies, but quality is, first of all, an approach that invests all the organization. In 2016, the Italian national Institute of Statistics (Istat) launched the Modernisation Programme, whose main objective is to enrich the supply and quality of the information produced, while improving the effectiveness and efficiency of overall activity. For what concerns organisational items, Modernisation Programme based on two main focuses regarding centralization of corporate support services, introduction of a portfolio and project management increasing the attention on statistical outputs and the efficient management of resources*

*In this frameworks, Istat switches from a functional organization to a matrix model of organization that aims to achieve a better human resource management, crucial in a diminishing resources perspective.*

*In Istat matrix model, staff knowledge and skills can be shared between functional departments and project teams according to needs. In this organizational model, people who work on projects have basically two leaders: the authority of the functional manager runs vertically downwards and the authority of the project manager runs horizontally. Precisely this crossing between the reporting lines determines the meaning of the matrix.*

*Istat has been experimenting a matrix organizational structure for almost 2 years and we have now elements for an initial assessment of the model. The paper describes how this model has been introduced at Istat, the advantages – both real and potential – of this structure in a statistical environment and the problems to cope with for a full implementation.*

**Keywords:** matrix model organization, human resource management, modernisation, project

**1. From the Modernisation Programme to a new organizational model**

In 2016, the Italian national Institute of Statistics (Istat) launched the Modernisation Programme, whose main objective is to enrich the supply and quality of the information produced, while improving the effectiveness and efficiency of overall activity. A simplification and rationalization perspective was followed, with the aim of moving towards a more effective and modern, as well as less expensive structure. In particular, an organization based on the model offered by the “business architecture” has been built - production, support, capacity, strategy. This choice aims to ensure a more efficient and collaborative use of staff, with a view to transversal in the commitment of resources.

Current organization is based on centralisation of corporate services (both administrative-legal and technical-scientific), provided by a *Directorate general* (DGEN) and a *Department for data collection and development of methods and technologies for the production and dissemination of statistical information* (DIRM), which are separate from the *Department for statistical production* (DIPS), responsible for updating / creating the variables of the registers system and integrating the data with the information produced in the surveys. The size and complexity of the new Institute organization requires a strengthening of the general level of governance that can guarantee a harmonious process, from strategic choices to operational actions. A new *Directorate for strategic planning, guidance of the national statistical system, institutional relations and international affairs* (DCPS) supports the governance at both Istat and National Statistical System level.

To guarantee governance, improve efficiency and effectiveness of processes and introduce innovation, the new model is based on a Portfolio and Project Management (PPM) approach, that defines a complex and integrated planning model: starting from the definition of the strategy and the objectives, it is possible to build portfolio of initiatives to achieve them.

The PPM is a reference model from a methodological and cultural point of view to manage the activities; it represents the framework which allows:

* evaluating, prioritizing, and selecting activities (projects) in line with strategy;
* directing the execution of activities towards tangible results, ensuring the monitoring and control of their progress and the achievement of the results;
* constantly measuring the commitment of the human and financial resources assigned;
* constantly monitoring the level of quality of the results, in compliance with service levels and end-user satisfaction;
* improving the managerial level by developing the culture and practice of results measuring and processes monitoring;
* encouraging innovative activities and managing them at corporate level.

Also the European Commission has developed a Project Management Methodology, PM2 , to manage the ESS Vision2020 projects at the individual project level.

At Istat, with modernisation programme, the introduction of PPM is developed at strategy level. There is a an important linkage between strategy, project portfolio management, and modernisation. The positive relation with strategy drives portfolio selection and project portfolio performance. The effect of strategic orientation on statistical activities is mediated by portfolio structuring and project portfolio management organization.

The whole ISTAT activity is managed “like projects” and organized into “initiatives”. Initiatives are proposed by researchers, analysed and approved by managers and included in specific portfolio.

Initiatives are the elementary units to identify statistical activities, administrative procedures and technical services. Initiatives are connected to an operating and defined result with human and economic resources, time and output associated. They are a set of related and organized activities that require more complex programming and management than individual work tasks. Initiatives can be classified in current activities and projects.

Current activities are a set of activities that can be traced to an operational process. They produce a statistical output or a service (administrative or technical) for statistical production with a defined cycle timing schedule. They also include analysis and study activities in the thematic, technical and administrative field, focusing on the consolidation of results, continuous improvement and incremental innovation.

Projects are a planned set of interrelated tasks to be executed over a fixed period with a start date and a realization date and within a defined and limited amount of human and financial resources available. They are normally innovative, and their outputs are new products, services and procedures, they contribute significantly to the Institute's strategic goals.

The Institute’s strategy is implemented through the Portfolio, that are a set of initiatives, independent of each other, related to the achievement of organization goals. Each Portfolio is associated with an organization structure that is responsible for achieving goals whit given resources.

The new PPM model was introduced by phases. Immediately after the adoption of the Modernisation Programme in 2016, ongoing activities were re-organized according to the new organizational structure and to the adopted PPM approach.

In 2017 the foundations of the Modernisation Programme were transformed into strategic and operational objectives and the whole activity of Istat was organized in initiatives.

In 2018 we are moving to a more stable and consolidated phase, with "fine tuning" and adaptation actions based on the experience gained.

**2. The matrix model**

According to the PMBOK Guide, the matrix organization is a combination of the project-based and the functional organization structures. It is a quite recent form of organization, since it has emerged in the Sixthies following the example of NASA.

The authority of a functional manager flows vertically downwards, and the authority of the project manager flows sideways. This dual managerial accountability and responsibility can be represented through a matrix, hence the name of the model.

In project-based organizations, the majority of the organization’s resources are focused on projects and projects are often developed for an external customer. The project manager has large independence and authority, he is a full-time member of a project organization and has project resources reporting to him. This kind of model presents a high level of flexibility and is adopted in very dynamic contexts, when the organization is required to react rapidly to continuous environmental changes.

On the other hand, in functional models, the activities are organized according to the level of homogeneity of the processes performed and the resources assigned to the functions have similar skills and knowledge.

This form of organization corresponds to mature contexts where the characteristics of the business and the needs of customers are quite stable.

In matrix organization structures, employees usually report to many managers (one or more project managers depending on the number of projects they are involved in, functional managers).

The matrix model is usually adopted in large and multi-project organizations, where the employees are shared among the projects and functional units according to the priorities.

*Type of matrix organization structures*

The matrix organization structures can be classified into three categories, depending on the level of power of the project manager:

• Strong Matrix Structure

• Balanced Matrix Structure

• Weak Matrix Structure

In strong matrix organizations, the project manager has large power and authority. The project manager has a full-time role, he is supported by a full-time project management administrative staff, and controls the project budget. The team members report primarily to the project manager and the functional manager plays a very limited role. The strong matrix structure is similar to a project - based organization.

In balanced matrix organizations, power and authority are shared between the functional managers and the project managers. The project manager can be supported by a limited project management administrative staff; both managers control the project’s budget.

In weak matrix organizations, the project manager has limited power and authority. He has a part-time role in the project and no administrative staff reporting to him. He is a coordinator and a facilitator but doesn’t control the budget and the team members report primarily to the functional manager. A weak matrix organization structure presents elements in common with a functional organization structure.

*Advantages and disadvantages of a matrix organization structure*

Matrix organization structures present a considerable complexity and require an important effort to be implemented. A full scale implementation of the matrix model within an organization should be gradual and consistent with the capacity of human resources - particularly managers - to change previous behaviour, attitudes, values, and to learn, experiment and consolidate the new behaviour required.

Neverthless, once introduced, a matrix structure can have some significant advantages:

* the use of scarce resources can be optimized: high skills resources can be shared among different projects and between the functional units and projects, according to the priorities set up by the organization.
* the matrix structure is more dynamic than the functional structure and facilitates communication and exchange of information within the organization; information dissemination is more effective because information run both vertical (across various levels of management and from project to project) and horizontal (across functional lines).
* employees can develop their skills and knowledge by participating in different kinds of projects. The matrix structure provides a good environment for professionals to learn and grow their careers.
* matrix models encourage the focus on results, efficiency and effectiveness.

On the other hand, some disadvantages can occur when an organization decides to implement a matrix structure:

* conflicts may arise between the project manager and the functional manager on the use of the few resources, thus affecting the overall climate.
* if the priorities of the organization are not clearly defined, employees can be confused about their role and responsibility, with the result of worsening instead of increasing their productivity.
* it is generally perceived that matrix organizations have more managers than required, which increases overhead costs.
* in a matrix organization, the workload tends to be high: employees have to do their regular work along with the additional project-related work.

In order to overcome the problems related to matrix organization structure, it is essential that within the organization there is clear communication from the top management about the priorities to be pursued, and that behaviour based on collaboration rather than on competition is encouraged. Furthermore, roles and responsibilities must be clearly documented and communicated to all and conflicts must be faced and solved as early as possible. For the success of a matrix model it is also necessary for the functional manager to step back and increase the delegation levels.

**3. The matrix model at Istat**

Since before Modernisation Programme, Istat employees used to work on both current activities and on projects; projects were usually carried on by working groups formed by staff from different business units. Although the activities developed by working groups used to create value for the Institute, they were not harmonized with the rest of corporate activity in terms of time and resource planning. From the planning cycle for the period 2017-2019, all Departments and Directorates plan both current activities and projects for the next three years specifying scope, rough scheduling, strategic alignment and engaged resources and roles. In the Strategic Plan for the period 2018-2020, 565 initiatives were approved and it is possible to describe them from a functional point of view (Portfolio) and an organizational point of view.

**Table 1. Initiatives’ number at Istat for 2018 from a functional and an organizational point of view**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | ***From an organizational point of view*** | | | | | |
| ***From a functional point of view*** |  | **Portfolio/Business Unit** | **DCPS** | **DGEN** | **DIPS** | **DIRM** | **PRES** | **Total** |
| **Product** | National accounts |  |  | 59 | 1 |  | **60** |
| Individual and households |  |  | 113 |  |  | **113** |
| Business statistics |  |  | 61 |  |  | **61** |
| Geographical and territorial units |  |  | 46 |  |  | **46** |
| **Service** | Communication and dissemination |  |  |  | 40 |  | **40** |
| Information technology |  |  |  | 49 |  | **49** |
| Methodologies |  |  |  | 32 |  | **32** |
| Data collection |  |  |  | 53 |  | **53** |
| Administrative Services |  | 58 |  | 12 |  | **70** |
|  | Governance | 22 |  |  | 13 | 6 | **41** |
|  |  | **Total** | **22** | **58** | **279** | **200** | **6** | **565** |

Source: http://ppmo.istat.it

The activities carried out within each initiative are coordinated by a project manager[[1]](#footnote-1), who is in charge of the expected deliverables. The authority of the project manager changes according to his experience and seniority, but in any case he must report to the functional manager who is the first responsible for the management of resources (human and financial). The model set up at Istat can be described as a weak matrix.

The whole workforce is allocated by the functional managers on one or more initiatives according to the percentage of their engagement in the different activities.

**Table 2. Initiatives, FTE and Project Managers at Istat for 2018**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Portfolio** | **N. Initiatives** | **FTE** | **N. project managers** |
| **Product** | National accounts | 60 | 154,5 | 49 |
| Individual and households | 113 | 293,8 | 97 |
| Business statistics | 61 | 223 | 45 |
| Geographical and territorial units | 46 | 127,3 | 39 |
| **Service** | Communication and dissemination | 40 | 152,3 | 37 |
| Information technology | 49 | 225,6 | 41 |
| Methodologies | 32 | 109,1 | 29 |
| Data collection | 53 | 348,9 | 50 |
| Administrative Services | 70 | 357,3 | 58 |
|  | Governance | 41 | 120,8 | 35 |
|  | **Total** | **565** | **2.112,5** | **480** |

Source: http://ppmo.istat.it

Resources allocation is frequently updated in order to register the changes that can occur during the year (an initiative can close before either later than expected, the commitment of the person can change according to new priorities, etc.). A Portfolio and Project Management Information System (PMIS - http://ppmo.istat.it) supports the planning and management of initiatives.

A resource can be assigned to an initiative either because of belonging to an organizational unit or because the resource is expert of a theme and his contribution has been required by a manager from a different Directorate. In this last circumstance, the resource is negotiated between the managers of different business units: the object of the negotiation is both the period of assignment and the percentage of allocation. Once the collaboration has been negotiated, the resource is formally assigned to the initiative, the engagement is communicated to the whole Organization[[2]](#footnote-2) and registered in the PMIS.

**Table 3. Initiatives with transversal collaborations for 2016, 2017, 2018**

|  |  |  |  |
| --- | --- | --- | --- |
| **Department** | **N. Initiatives**  **2018** | **N. Initiatives**  **2017** | **N. Initiatives**  **2016** |
| **DCPS** | 14 | 13 | 11 |
| **DGEN** | 30 | 31 | 7 |
| **DIPS** | 64 | 64 | 47 |
| **DIRM** | 68 | 76 | 47 |
| **PRES** | 2 | 3 | 2 |
| **Total** | **178** | **187** | **108** |

Source: http://ppmo.istat.it

Table 3 shows the number of initiatives which employ members from different Directorates, according to the matrix approach: the total number has been significantly growing from 2016, with a deceleration in the last year.

The new model, despite the application difficulties, proved to be of fundamental importance in the start-up phase of Modernisation Programme. In fact, with the new organization, a significant percentage of the workforce has moved from one function to another, thus creating a sort of organizational shock. The possibility for resources belonging to different organizational units to collaborate in a structured manner, as matrix model requires, has allowed a faster exchange of skills between people in transition from one role to another. Also for the future, the matrix model will encourage knowledge sharing within different organizational units.

The matrix model guarantees an efficient use of human resources, as it allows managing workloads and keeping the resources used to the maximum of their capacity over time.

**4. Issues and opportunities**

The transition to the matrix model at Istat has required a period of adjustment still in progress. The resources moved from a single command model to a complex dual or multiple command model, which in some cases caused uncertainties and a high level of pressure on individuals.

The most critical issues emerged during the phase of resource negotiation. In the first application of the matrix model, it has often happened that the resources’ commitment has been negotiated among executives without a proper involvement of the resources themselves: this sometimes led to discontent and to a lack of clarity about the objectives to be aimed. To facilitate the sharing of resources and make the whole process more transparent, a new procedure is being evaluated that defines the different actions to be performed and the actors involved in the different phases of the negotiation.

In Istat experience, the coordinated management of all initiatives within a portfolio has delivered benefits beyond the results of independent lines of activity. Although these additional benefits are often not put into practice due to complexity of the numerous interdependencies within the portfolio, it is worth the efforts to reduce double work and enhance synergies regarding technologies, knowledge and resources.

Additionally, the model's design has oriented positively the organization to the development of synergies. Emphasizing the importance of synergies from a corporate strategy perspective is a first step to prepare the organization for prospect needs.

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1. A ”project manager” can be in charge of both current activities and projects [↑](#footnote-ref-1)
2. The list of all the initiatives and of the resources assigned to them are periodically published in the Institute intranet. [↑](#footnote-ref-2)