

DESIGN OF AN INFORMATION SYSTEM FOR PLANNING*

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1. The Characteristics of an Information System for Planning

1.1 The Emergence of a New Need

An ever more pressing need emerges from the considerations outlined above: to contribute to the improvement of a "central system of planning", with greater technical-scientific back up: the creation of a (national-regional) information system for planning.

The need for such a system was particularly felt in the years of the preparation in Italy of the second five-year plan (1970-71). The planning office, on the one hand, elaborated research (called the "Quadro" Project), about which it would be said later that it would have constituted the framework for an information system, and on the other, decided to launch a pilot-project for the creation of an automated information system for economic planning (the SIAPE Project).

However, the institutional crisis in planning and a certain immaturity and incompetence which predominated within the very organs that should have carried the projects forward, led to the shelving of the first - after a far from perfect first round - amongst a string of "postponements", and to the failed launching of the second.

With the present contribution, we wish - in the light of the experience had and with the motivations given in the introduction - to define further the outline of an "Information System for Planning" (that from now on will be abbreviated as ISP) and above all to trace the operational route to be followed in order to arrive at its efficient functioning.

1.2. Functions and Characteristics of the ISP

An ISP should, above all, be for the elaboration of data, for the purpose of

* This paper summarizes the IT implications of the Strategic Planning and Programming at national (or federal) level. It has been prepared after the conclusion of the Progetto Quadro (see), a basic research project of the Planning Studies Centre (see the website: www.planningstudies.org) experimented in the beginning of the seventies at the governmental level in Italy. It has been inserted as chapter n. 19 of the Author's book: *An Accounting Framework for the National Programming and the Strategic Economic Policy* (Rome, Psc, 2002)

supplying information for planning and direction that is useful to all the decision-makers, whether macro, meso or micro¹. The system would consist of a continuous process of elaboration that could be divided into a series of "phases":

- The elaboration of an articulated scheme of variables capable of framing all the most important phenomena, over which decision-making control should be exercised.
- The quantification of the scheme and the institution of a mechanism of statistical observation-elaboration of the data concerning the scheme. The fixing of the timing of the observations-elaborations.
- Procedures of "planning" elaboration for the macro-decisions concerning the future projection of the scheme. Elaboration of the typical planning variants and the quantitative determining of the planning frame of reference.
- The constant updating of the frame of reference by means of the feed-back of the micro-decisions (coherent or not with the planning frame) on the quantifications of the frame for which see SUB 3.
- The constant temporal postponement of the information frame with the formation of an updated base and a periodical rielaboration of the planning schemes for which see SUB 1.

The process is continuous in as much as it develops in time through the permanent provision of information and the information feed-back that, from the statistics and decision-making centres, returns to the centre for the collection and elaboration of data.

The third phase is the "political" one in the process, where, in the elaboration of the data and in the determining of the variants, political macro-decision making organs should participate, both "activated" or "consulted" according to precise and codified methods and procedures.

The ways and means of this "participation" depend on the contents, which are extremely varied, of the information frame at which we will take a rapid glance in the next paragraph. In short we will say that for all the options relative to the final use of resources and to the plans of needs and priorities evaluation, it is the political representatives - in the various primary and secondary instances - that should be consulted.

For the options relative to the modalities and productive and operational instrumentations, it is the representatives of the producers' workers and of the operators, whether public or private, that should be in the main consulted.

Those that we have called "micro-decision makers" are in effect, in almost all cases, operators (the production bodies). For which the feed back of the micro-decision makers on the elaboration of the planning frame regards essentially the part of such a frame that is relative to the objectives of production and organisation of the said production.

It will be the information system's task to analyse the implications of this feed-back on the objectives of final use resources, and recycle the mechanism of activation and "political" consultation on this point.

¹For the conventional meaning of these expressions see the nomenclature appendix.

1.3. The Contents of the Information-Planning Frame

As said, the information and planning frame would be structured on a system of variables or phenomena which are considered essential to maintain under informatic control (or which are "basic" for the elaboration of those that are meant to be kept under control).

Research in this sense is already underway. In the preparatory phase of the second Five-Year Plan - which then did not see the light - the Budget and Planning Ministry promoted a special line of research - called the "Quadro Project" - aiming at the construction of an accounting framework of reference for planning².

The research carried out led to a conceptual scheme of reference of phenomena and to an initial attempt at its quantification, according to a defined procedure of calculation and evaluation.

The "scheme" (albeit still approximative and not in any way discussed in political instances), could still constitute a good reference for the information system, about which we are speaking. The quantification should be on the other hand completely reviewed, in the light of the possibility of using for *data collection*, the most advanced information technology, and for *calculation procedures* particular mathematical systems.

The structure of the Framework (Quadro), as elaborated by the Quadro Project, concerns a system of data that in essence regards the utilisation and formation of resources, on the basis of the known criteria of national economic accounting, integrated in the most advanced way possible with the economic evaluation of all the goods and services that do not have a market.

For the collection of data on the utilisation of resources the system involves:

- an analysis of the structural interdependencies of each productive process, above all therefore a system of information on the variations of the productive processes that are able to update the input-output table of the processes themselves (ie the conditions of "dependence" for each sector or productive process on *all the others*);
- a more special analysis of the role, in each productive sector, of the primary factors of production: labour, territory (or physical environment), and capital (or incorporated work).

Labour analysis implies an updated series of information on the demand for labour, qualifications, conditions (by sector, territorial ambit etc.), and conversely on the supply of labour (conditions, education, qualifications, behaviour etc.); and therefore it implies the construction of a permanent "*equilibrium*" for the so-called labour market and its past and future evolution.

The analysis of the territory (or of the environment) implies likewise a information on the various types of territory and environment (soil, landscape,

²See Archibugi (1972) and (1974).

noise, air, water etc.) crossed for the various types of use of the same (agriculture, industry, transport, habitations, services, tourism etc.); and therefore - as for labour - it implies the construction of an "*equilibrium*" of the territory, in which the territory "supply" and "demand" are compared.

The data for the production of resources (including those connected to "resource factors" and to "intermediate resource goods"), both for "present" production and for "planned" production, are articulated - no differently than for those on the utilisation of the same resources - :

- by production sector (corresponding to a classification that identifies the processes rather than the products);
- by production "institution" (type of enterprise, size, body, administration);
- by territorial production spheres: regions, metropolitan systems, etc..

The set of the system of accounts represented by the Information Framework is divided into two information categories:

- those relative to the variations of the *quantities* of all the resources implied in the Framework (whether they be resources evaluated at the time of their formation or of their production);
- those relative to the variation of *prices* (of the market or evaluated according to other criteria) of the same resources mentioned above. An important part therefore of the information system of the Framework concerns the variations of *prices* (of the goods and services and of the factors of production, such as the land, labour, capital) and of *incomes* that are formed with such prices.

In connection with that the information is constructed on the financial movements, that, on the basis of income (in particular that not used for current consumption), are developed between the institutions of the community: the State, enterprises, families etc.. Such movements concern the *transfers* of income that are carried out above all between the State, enterprises and families, not to mention the debts and credits, always concerning the same institutions (and their sub-divisions).

On all the contents of the Information Frame, thus listed succinctly, that make up a system of interconnected variables, variation models may be elaborated, founded on parameters drawn from past reality or of the planning type (or conjectural type) that will give place - as said - to different projections of the Frame ("scenarios"), founded on different planning hypotheses or different conjectural hypotheses.

1.4. The Subjects for an Information System for Planning

The operators (or micro-decision makers) assume the role, with respect to the described information system of users and also of providers of data. In fact, any decision of theirs alters the actual equilibrium of the frame and "provides" the

impulses for the readjustment of the frame itself. The information that the frame may provide for the macro-decision maker (Central Government or Regional Government) serves then to judge and evaluate the opportunities of intervention in the micro-decisions, if their effects are not in line with the development expected by the planning frame.

The intervention in the micro-decisions (and in the meso-decisions, that are those with a greater "pulling" effect), as is known, may be of various types: authoritarian, persuasive, incentive-giving, contractual, "threatening", etc.. But any intervention finds in the information system the rapid possibility of simulating the effects of any alternative decision that in the intervention phase may be proposed or suggested.

Naturally the macro-decision maker as well, with respect to the information system, has the double role of *user* and *supplier of data*. Apart from the fact that since the "macro" decision - as mentioned - is a decision that is taken at a not directly operational level, the "data" that it provides is the calculated conjecture of the induced effects of certain measures (if they are applied by the operators, with micro-decisions); thus the data coincides in the result of the mechanism of elaboration of the information system itself.

2. The Implementation Instruments of an Information System for Planning

21. Central System and Peripheral System

An information system of the type described involves for its implementation instrumentation founded on:

1. a central system of storing, calculation and elaboration;
2. a system of terminals to be used by the operators.

The central systems are "central" with respect to the terminals; but they may constitute themselves a *network* distributed with regard to specific competencies, interest priorities, etc.. Their localisation may be thus decentralised, according to how the plan of feasibility and that of the design of the system consider most apt.

The central systems will be composed obviously of a system of computers and software for the constant adaptation of the technology to the always changing and new needs of the utilisation of the system.

With the central systems will operate the constructing and coordinating centre of the planning frame, that represents the technical manager of the information system.

The system of terminals will give life, as said, to the system itself, in as far as it will constitute its "finalisation" and also its "alimentation".

The *finalisation* will consist of two types of "*services*" that the terminal link-up to the system will give to the micro-decision maker, as *user*.

The first service consists of informing the above of the lines of planning

direction within which his or her decision should be located. It is a question of allowing the micro-decision maker/user to evaluate the *upstream constraints* of his or her decisions, that are fixed in the integrated planning stage. At the same time as knowing the constraints, the micro-decision maker knows not only the *actual context* but also, and above all, the *programmatic* one in which the decision is taken and, therefore, the *future effects* that can be expected from it. His or her choice will grasp a surer "optimality", in as far as the "data" on which it will be calculated are data that incorporate the joint effects of the thus constrained choices of other decision makers, that are amalgamated by the information system itself. It is pointless to say that from the knowledge of the programmatic context and of the constraints to his or her choices that derive from it, the micro-decision maker can obtain the awareness - when the constraints assigned to him or her are too rigid or have not taken into consideration particular or new factors of evaluation - of the need to "contest" such constraints, and the subsequent demand for the revision of the framework, at least in the sectors that regard it or refer to it. The same dialectic of interests or debate of opinions would acquire in this case, a constructive and organised character as opposed to a dispersive or chaotic one, limited operationally to the evaluation and measurement and comparison of the effects of alternative solutions.

The *second service*, that the link-up by means of a terminal gives to the micro-decision maker/user, is that which puts him or her into contact with a computer apparatus that - having posed the systemic constraints on his choices - may be utilised for an "operational research" at the level of the individual operator, with the obvious aim of optimising decisions albeit within the boundaries of freedom fixed by the "upstream" constraints. This naturally can be done only with the elaboration of an *ad hoc* decision-making model, with software adapted to the individual needs of the micro-decision maker. The operational unit in such a case would use the service of the computer like a normal service of technical assistance for the mathematical recording of data and for the elaboration of decisions.

Naturally the latitude of this second service is provided by the latitude of the information of any type that the system of central computers can provide for the individual user, even outside the organic information system for planning. This will be connected to the possibility of the central system (finalised at the construction and management of the programmatic frame) of constituting *a latere* specialised data banks that are specialised in relation to the phenomena also not considered from the bank of the Frame itself³.

³For example in France - where they have not yet got to the point, it seems to us, of conceiving a Data Bank for planning - they are convinced that any administration will be led to constitute an information system in order to improve management; and, on the basis of that, and for the intermediation of "individual central information systems", it is considered that a data bank "will be constituted by two categories of organisms:

- by banks of sectorial data that are destined to satisfy the various needs of certain users (eg a data bank on international commerce destined essentially for export-import firms, and, obviously, for the administration of the Customs and foreign commerce);
- of banks of territorial data, destined to satisfy the various information needs, for a determined area, of all the categories of users; this is the role (in France) of regional economic observers today" (see DATAR, 1971 p. 43-4).

The "alimentation" of the information system that will be guaranteed by the terminals, will consist of the *transmission* that the agency/operator micro-decision maker will assure - by means of those terminals - towards the general system, of the *data* relative to their decisions and their management. A large part of the operating agencies are also in fact the primary *source* of the statistical information that constitutes the information Frame and its elaboration.

The terminal network will have to be at least as extended as the structure of the Frame is articulated and its information content is varied.

The feasibility project of the information system (ISP) will have also to include the possibility of inserting into the relation: central computer system/peripheral terminal system, also a possible peripheral system of mini-computers: peripheral not only in the sense of location, because this can also be the "central" one - but in the sense of their utilisation for *partial* systems of collection and elaboration of data, valid only for "peripheral" aspects of the entire information frame.

This possibility will be studied and suggested only with regard to:

- the technical elaboration of hard-ware in the course of development;
- the content elaboration of the information frame and its articulation.

2.2. The Preparation of the Personnel

If the instrumentation of the Information System is represented by the central system of computers and the peripheral system of terminals (with the possible insertion of a peripheral system of mini-computers, for well-defined sub-decisions), the general condition for its functioning (and, even before, for its installation), lies in the *formation of the personnel* at the various levels of the utilisation of the system.

In the first place among the decision-makers, who are responsible for the operational and decision-making units, it is necessary to form an "*awareness of informatics*", which, at the present time, is far from being widespread. This awareness with regard to the decision-makers consists of knowing the potential of the information instrument and of the acquisition of the scientific method of planning and of the assumption of decision-making⁴.

In the second place, it is necessary to have available important contingents of technicians and analysts that can be placed with the operational and decision-making units who know how to concretely utilise the instrument at their disposal: the information system, and in particular its terminal. It is necessary to create the

On the other hand, still in France it is considered that one is on the eve of a reform of the existent information networks, in order to allow for their technical integration. In the study quoted above on p.53 it is said: "Today any functioning computer still constitutes a prototype whose utilisation is inconvenient because it implies intermediaries; in the future, however, the information network, as has happened for the telephone network, will impose a normalisation of the various sub-systems (hardware, software, information transmission ...) of the "standardised" interfaces and the generalisation of standard programmes".

⁴On this point see in particular A. Romano (1974).

foundations for an "*informatics competency*" among the decision-making offices of the operational units.

In the third place it is necessary to create a staff of researchers and analysts that can assure the general and interrelated functioning of the central system. Given the great variety of necessary skills for the construction and management of the information frame, these specialists will have to be prepared "on the ground" - whilst taking advantage of the basic competencies and origin of each of them - but converging together in the fundamental aim of making the information system work.

The tasks of this staff of researchers and analysts will not be the same but rather articulated in fields that may be thus summarily classified:

1. the study of the methods of *integrated planning*, as a procedure of elaboration of the information frame and of the different cases of use of the same;
2. the study of the technology of "plans" (applied software), that can be used for the aims of integrated planning and for the integrated decision-making process;
3. the study of the technology necessary for the good functioning of the system (basic software).

2.3. The Promotional Capacity of a Network of Terminals

The diffusion of a network of terminals among the operational and decision-making units, if conditioned by the presence of a widespread "informatics awareness" amongst the "political" decision makers and the managers of such units, and by that of a good "informatics competency" amongst the same direct users of the terminals, is also an important factor for the promotion and development of that same awareness and competence.

Seen in this light, the spread of a network of terminals - if aimed at a central system that is not purely for calculation, but also methodologically orientated to procedures of integrated planning and decision-making - constitutes (albeit with some initial "waste") a chance to get the operative units (managers and technicians) used to *deciding in terms of* informatic procedures; and/or that of familiarising oneself with the opportunities offered by the presence of a terminal, above all if it is linked to a central system of (collected and processed) information that is pre-ordered according to the problems and operational choices of the units in question, and at the same time "integrated" with a system of national and regional planning.

Naturally, the simple presence of a terminal and that of a link-up to a central computer do not magically create an informatics awareness, if such a presence is not accompanied by appropriate involvement and training of the personnel.

2.4. The Formation of an "Informatics Awareness"

The involvement and training of the "political" managers may assume various

forms, amongst the most effective there is, however, that of getting them to participate in typical decision-making procedures which are strongly analogous to that for which they are responsible *ex officio*.

In the cases in which the operational units from which they originate are so important as to justify it (also with regard to the number of managers coming from the same unit, that participate in the training activity), one should make them participate in decision-making procedures that are, in effect, taken from the operational unit that they manage. This may be the case, for example, of Regions, large industrial complexes, or of large bodies of sectorial management.

The techniques for participation in decision-making procedures are most varied according to the cases and levels of preparation or setting of each group; nevertheless they are reduced essentially to forms of "active" social dynamics, for example with "brain storming" for the definition of the objectives and "delphi methods" for the procedures of evaluation. The seminars for the realisation of an "informatics awareness" should include as well the simplified basic elements of the principal technological components of informatics.

2.5. The Formation of an Informatics "Competency"

The training of a staff to be developed and nurtured among the operational units, as terminal staff or for the direct utilisation of the information system, presents some extra difficulties, because of the basic preparation on which such training must be based.

Susceptible to such a formation will be those persons who have a technical-scientific background: such as only a degree in the mathematical or physical sciences, or particularly one in information sciences and some engineering and statistical sciences can provide. Or it would be necessary that graduates from other faculties had carried out a specific course in Information Technology or a similar discipline.

For the preparation of such a base, the specific formation of a competency on the part of the staff in the operational units implies a series of courses of specialisation that should be articulated in the following two directions:

- methodology of integrated planning and intensive knowledge of the processes of the construction and elaboration of the informatic framework for planning,
- technologies of formulation and updating of programmes (soft-ware) in decision making processes and techniques of optimal evaluation (linear programming, quadratics, "dynamics" etc.).

2.6. The Training of the Central System Analysts

The training of the staff of analysts and experts that manage the central information system for planning, implies even more complex problems. Above all the range of basic skills will be widened, since the process of construction and quantification of the planning frame implies different skills for each of its phases

and contents. Moreover, an appropriate formation at this "frontier" level - of the integration of the traditional disciplines with the methodology of integrated planning and with the utilisation of the information instrument - implies an "active" method applied to the construction and quantification of the frame.

More than a real and proper training, it is a question of training a large articulated *working group* (for which internal changes and dispersion in the field will naturally be taken into account).

The preparation of this staff represents the most complex task of the creation of an Information System for Planning. And while, on the one hand, it will take a long time, on the other hand, it will constitute the necessary premise for the implementation of the mechanism, and for the preliminary construction of the initial frame.

A partial compensation for the expected difficulties is that one side of the experts may already be found in certain centres of research and in some Universities. It is a question only of harmonising the work and coordinating the operations, according to a common methodology to be taught and carried out. At the same time the construction of the planning information frame may be "cyclic": it may consist of successive rounds, through which one passes from less elaborate and detailed and perhaps lacunose approaches, to more elaborate, detailed and more exhaustive approaches.

The successive rounds will substantially be able to correspond to the various levels of advancement in the availability of a staff that is suitable and trained for the purpose.

3. Initial Considerations for Design

3.1. The ISP as a Project of National Interest

The creation of an Information System for Planning (ISP) may constitute a "*project*" of national interest.

The ISP project as such will have to interest the majority of the agencies that are to a greater or lesser extent involved as users or suppliers of the system.

These are in the first place:

- The Ministry of the Budget and Economic Planning and its related bodies, firstly, ISPE, ISTAT, and ISCO;
 - the Ministry for the South and the Fund for the South (and related bodies, firstly, FIME and FORMEZ);
 - the Ministry for Scientific Research and the CNR - the Council for National Research;
 - then Ministry for Education and the Informatics Centres of the Universities
- but then, successively,*
- all the Ministries and Administrations that assume macro-decisions (and also "meso-decisions") and which control the formation of data (eg, the Treasury,

RAGIONERIA XXX, the Bank of Italy, the Ministry of Finance, Ministry of Labour, etc.);

- the Regions
- the large public national bodies (eg the insurance and social assistance bodies)

Like all projects, the ISP project will too have be realised *in stages*, that are coherent with the times and objective difficulties for the realisation and "implementation"⁵ of any project.

In the first place - in the "first phase" - the Project has to be studied in its operational details, times, costs - in personnel and resources - and in its *feasibility*. In other words, before entering the *executive* phase, this phase has to be *planned* in detail.

For example, it is necessary to know how long it will take to create the structures of the ISP and to construct a first Frame. What time scale and what diffusion will the ISP have by means of the installation of terminals, etc. etc.. and what means, in personnel and finance, will these operations take and in what ways and times.

3.2. The ISP System as a Rationalisation of the Investments in the (Informatic Sector)

The investments and current costs in the electronics and informatics sector are developing without a precise plan and with regard to casual and occasional needs. The "demand" for informatics is therefore discontinuous and chaotic.

Some countries are fully aware of the danger of a chaotic development, such as the French, for example,

- who are not new-comers in informatics;
- whose administrative structures are quite similar to the Italian ones;
- who adopted a central economic planning system several decades ago.

In the study promoted by DATAR in 1971 it was said in fact that:⁶

Numerous informatics experiences are taking place at the moment in various administrations; these realisations, whether they concern information systems or those of management and support for decision-making, seem to be developing independently one from the other and, if nothing is done to attempt to coordinate these vast works and above all to normalise the indispensable, we risk, five years on from now, using information systems for ministries, that cannot communicate among themselves if not at the cost of highly expensive equipment and programmes. Thus one would find in the informatics field the same administrative obstacles that exist at the moment and which are the inheritance of the past. This inconvenience would

⁵We are using this word to mean not only the concept of "realisation" and "putting into effect" but also that of the preparation of the human and organisational means that are necessary for the realisation itself.

⁶DATAR, (1971), pp. 59-60.

bring with it a defective working of the administrations despite the use of ever more numerous personnel, which would be an outcome completely contrary to that sought for with the introduction of informatics; to avoid this risk it is necessary to consider, as of now, the next step. Otherwise - the report continues - we will be obliged either to abandon the idea of realising a real informatics network or to construct it, but at the price of an enormous effort that would end up within a few years making *tabula rasa* of that which we had acquired". The French report goes on to say in conclusion to these remarks: "we cannot let the informatics phenomenon develop without intervention, the risks of derailment are too great, we must ensure together a harmonious and continuous growth of informatics in France, and we must confront with voluntary actions a new more desirable evolution which conforms better with the objectives of territorial planning than has been the case up until now ...".

The observations quoted concern more widely the uses of information instrumentation, on the one hand, and more restrictively the initiatives of administration, on the other. But if worries about the risk of chaos are felt in France, where they are much more advanced with regard to computer applications than we are, we may sense the utility of a ISP system - like that indicated - in helping to control the ordered development of installations, that commences from a use that is prevalently dedicated to the planning of decisions, and to this may be linked even in varied ways, the particular information use or even the accounting techniques of management.

In a situation, like ours, of extreme backwardness - in particular as can be found in the South - in which efforts must be strongly concentrated and one cannot permit costly and useless wastes; where public intervention cannot but have *priority* with regard to collective necessities and promotion; in which finalisation towards choice planning has priority as well with respect to a richer and maturer economy; it cannot but be *indispensable* to start from a well-defined problematic; and to take steps where the need is most evident; and to establish priority links with the various operational and decision-making centres; and to take advantage therefore of all this to create "*a real informatics network*" that is clearly workable and transitable, linked to one "system".

By this one does not mean, that the facts will not largely negate the intentions: that there will not be "spontaneous" development to be considered that will constitute as such an incentive anyway for the development of an informatics "conscience" and "competence"; neither that all that which develops in the informatics sector will have to be necessarily tracked back to the same system; nor that all the "informatics" services that can be asked for or provided, should necessarily be expected from the system and evaluated with the same criteria. A large margin of autonomy for development will be necessary, and it will be probable even in the context of this country's lack of resources.

3.3. The Operational Phases

a. The Feasibility Project

The first phase consists therefore of the design study, in a Project of feasibility. Such a project implies a calculation of the means and times, but also vast consultation of the operating bodies that should be involved, in order to sound out their availability, identify their operational preferences and the actual conditions of operability.

It is only at the end of the feasibility study that the effective costs of the Project and the most advisable institutional and organisational modalities can be evaluated.

Such a feasibility study cannot be carried out in less than eight months, but cannot go beyond twelve months, since otherwise it would lengthen enormously the times of execution and application of the entire Project.

In the present preliminary study or (or pre-study) we cannot delve deeply into the subject of the feasibility study: ie to indicate the modalities and times of the Project. Some rough guidelines will however be given that are obviously susceptible to correction in the actual feasibility study.

For the execution of the feasibility Project (a year) a single interested body could be promoter: for example, the Ministry of Research. There would not be any strict necessity to consult beforehand other operational bodies or other Ministries. That would be the object, in fact, of the draft of the actual Project of feasibility: the staff or group charged with the Project of feasibility would have - as mentioned - as its task to sound out the various availabilities and needs of all those potentially interested in the Project.

b. The First Phase of the Project: The Construction of the "Frame"

The first step of the actual project, would be then - as said - the construction of a unitary information Frame of Planning .

We know that this first engagement will need a year's work. It is a matter of gathering the existing information and articulating it according to the pre-chosen structure. The existence of the "*Quadro*" Project - "Frame Project" (Ministry of Budget and Economic Planning) will facilitate the times and modes of definition of the structure: one has only to sought out what has already been done.

The collection of data and the quantification of the frame, on the other hand, will necessitate a new important work, both for the updating and for the perfecting of the data previously collected.

A large number of study Groups will have to work on the subject. In the first phase of the *Quadro* Project there was expected to be about fifty (thirty-nine were actually constituted) with a total of eighty experts involved. In the new effort there cannot be less than about a hundred groups with the involvement of about two hundred experts, if a substantial improvement on the very primitive approach of the *Quadro* Project is to be made.

The work of preparation of the "Frame" constitutes at the same time, as mentioned, the work of the *training* of the central staff of the ISP. It is obvious that the preparation of the Frame has been evaluated at *a year* not with reference to the necessary technical time for the collection and elaboration of the same

"Frame", but because it is necessary to give a *conclusion date* to the first phase, since it is necessary that the *dialogue* then really begins with the operational centres and the Terminal Units (T.U.) constituted among them.

In a year of work what can be done will be done; and the Programme of feasibility will indicate the essential contents with the estimation and planning of the individual times.

c. The Progressive Installation of the "Terminal Units" (T.U.)

Once the "Frame" is available a dialogue will have to be had with the "Terminal Units" (T.U.). But the T.U. "will only be constituted in a limited number: the number rendered possible:

- by the preparation of the informatic "competencies" among the T.U.;
- by the preparation of an informatics "awareness" among the managers of the operational units and agencies with whom the T.U. are installed;
- by the present state of evolution of informatics among the operational units, examined and evaluated by the feasibility Project. In effect, it will be the task of the feasibility Project to indicate which first ready and prepared operational units will pilot the installation of the T. U.. The evaluation of the feasibility Project will have to harmonise as much as possible the existence of a state of actual advancement of informatics and availability, with the objective different relevance that the various operational units have for the determination of the Frame and the good working of the ISP.

d. The Informatics "Awareness" Development Programme

For the development of an informatic awareness the feasibility study could contain an *ad hoc* study. It has already been said that activity in this direction should be addressed to the promotion of an *institution of seminars*, structured on a typical scheme, and founded on the utilisation of the "active method". One will obviously have to take into consideration the particular quality of the participants - political and administrative managers of large administrative and industrial concerns - with regard to the length of the seminars (week-long? weekend?), the location (large urban centres? tourist locations?), and the contents.

For the seminars that are attended homogeneously by a single operational concern (eg the State RAGIONERIA, the State Railways, the Education ASSESSORATO for the Calabria Region) the typical scheme will preferably have to be adapted to the problematic of the operational body of origin, and the "active method" will have to be developed in this direction.

Organisationally one could get to the point - giving an initial approximate estimation - of involving about 1000 managers every year, with permanent activity for about 50 weeks, and the permanent utilisation of a team of not less than 20 people. Obviously once the typical schemes have been elaborated and the didactic and organisational mechanisms put into effect, the results could be

multiplied by simply increasing the number of teams.

The first experiences (those of the first year, for example) will naturally be "pilot" ones from all points of view:

- they will be considered as didactic experiments that are susceptible to suggestions for modifications to the prechosen method, for the successive experiences;
- they will be carried out for and care of the agencies in which is first developed the creation of a T.U. in connection with the Centre, giving indications for future links.

The breadth of the preparatory activity for an informatics "awareness" has only an indirect influence on the development of the links with the T.U. and the entire System: it is a question above all of an influence on the *quality* of the functioning of the system rather than in the quantity of the links. The presence of a good informatics awareness is above all essential, in fact, for a good utilisation of the ISP for the sake of "orientating decisions" rather than for the sake of a simple "exchange of information".

During the first year of the Project then - that in which the central staff of the ISP prepares the Frame or, in doing thus, forms itself - one will try *at the same time* to achieve as much as possible:

- the training activity with regard to the managers of the operational units or Agencies (the so-called preparation of an informatics awareness);
- the activity of informatics preparation for the future managers of the T.U..

Such activities will obviously be of a multi-annual nature and they will develop independently from the functioning of the ISP (even whilst in some way being a part of it). As time passes the "bridge" that will be realised between the training activity and the functioning of the ISP, will be found in the fact that more and more the training activity will use for its demonstrative aims *concrete examples drawn* from the functioning of the ISP, both with regard to the setting up of the seminars promoting informatics awareness, and with regard to the dialogue mechanisms between the Frame and the T.U. or that of technical assistance for decision-making between the Centre and the T.U. which will be the object in the preparation of the informatics "competencies".

e. The Training Programme for "Experts"

The training of the experts that will install the T.U.'s is certainly more problematic and slow. It is conditioned quantitatively by the sufficient and suitable "outgoings" from the basic training sectors (apart from the actual presences in the various sectors of the operational units).

Again in this case the feasibility Project will have to indicate, after ascertaining the actual state of the presences, and moreover after an analysis of the actual potential of the training sectors, the *quantum* of experts on which one will be able to count in the first year, the second year and so on, and thus will have to make an estimated "Plan" of the installation of the T. U..

From this point one can say that the period of post-university training for an

expert of a T.U. cannot be less than a year.

In addition to fundamental informatic knowledge, the training of the T.U. expert will involve:

- specialisation in some quantitative techniques of programme evaluation and of the utilisation of calculation programmes;
- deeper knowledge of the general structure of the "Frame", its functioning characteristics and its adaptability to problems and decision-making techniques.

Naturally is only with the installation of a considerable number of T.U. that the general system of relations between the Frame and the operational decision-making units will be able to function in the way described in the first part. XXXX

Therefore the evaluation of the times of installation of the T.U., of the availability of the various operational and decision-making units for this installation and of the capacity to produce *experts* to equip these T.U., is a *key point* in the whole implementation of the Project.

In the first two to three years of the Project the maximum effort should be addressed to the installation of the T.U., but obviously the measure of success of this effort can be had - and only as an estimate - when the group that carries out the feasibility study has measured the actual strength and potential strength of the educational system.

Appendix: NOMENCLATURE

Macro-decision: the decision that is taken at a not directly operational "political" level and which regards both the direction to be assigned to the operational bodies, and the indirect instrumentation to stimulate these bodies to follow that direction, or to implement it directly.

Micro-decision: the decision taken by a single operational body, which is institutionally autonomous with respect to superior authorities, but which takes into account their decisions as constraints in order to optimise its own.

Meso-decision: the decision taken by a group of operational bodies, correlated institutionally, (a holding of enterprises, a sector association, a trade-union) that is institutionally autonomous with respect to the superior authorities, but which takes their decisions into account in order to optimize its own and whose decisions its own may have a tangible influence.

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