

INNOVATION PROCESS AND PUBLIC AIDS TO ENTERPRISES ¹

I. The innovation process.

- * The following elements of the innovation process seem to be relevant to the subject matter:
 - the innovation process is intended as the ensemble of activities that, starting from research (oriented basic research and applied research), pass to development, to engineering, demonstration and production and marketing. They have in common the objective to innovate the product and/or the related manufacturing process;
 - the innovation process is usually divided into separate projects, at the different stages of the process. Parallel competitive projects are generally undertaken at each stage, the more so the more one is far from the last stage (industrialization). When passing from one stage up-river to the next down, the several competing projects are compared and a selection is made of the more interesting ones (or a combination of them) to be continued. While the number of projects is reduced passing from one stage down to the next, the total cost of the program is increasing;
 - the larger is the number of competing projects at each stage, the higher the probability that the innovation results will be a success. As a matter of fact, the objective of the innovation program becomes more and more clear and definite, the more the final stages are approached.
The larger the number of alternative projects (and greater the resources and time allocated to them), the higher is the chance to make an optimal selection when passing from one stage to the next and to define the innovative objective of highest value (both to the company and to the consumer);
 - the inputs of ideas and results, at a given stage, to the innovation process will come from the company up-water projects and activities as well as from external sources (public knowledge and transfer of know-how from other companies) The ratio between make/buy expenses at the different stages of the process varies from sector to sector and from company to company. There is no best recipe because of the strong dependency on the environment on the company history, on the more or less scientifically based industrial sectors. The situation moreover changes with time;
 - at a given moment, in a given company, are pursued projects that pertain to different stages of the innovation process possibly having the same general innovation objective. In that case, the innovation objectives differ in their specific value of the target (quantity, quality and degree of risks);
 - for a given company, at a given moment, the amount of resources allocated to the different stages of the innovation process has to be compared to the competing companies. Such a comparison is an important parameter to judge the company

¹ Note prepared by U.L. Businaro as a contribution of FIAT Delegation to Europe.

medium and long term competing ability. Because of the variation from company to company of the make/buy ratio of technological knowledge, it is more important to compare the integral amount of expenses on the innovation process than the stage-by-stage expenses.

2. The rational for public aid to the innovation process.

- ★ As a general rule, a company under normal conditions should not depend from public aid to assure adequate resources to its innovation process.

Aids are acceptable, therefore only under special transitory conditions, to help single companies to assure the proper flow of resources needed for an adequate innovation process during difficult periods. In such a case, not only the public aids do not represent a distortion of competition, but they are the very base to assure medium and long term multi-companies competition. (A company successfully competing on the short term, that is not able to devote enough resources to the medium-long term objectives of innovation, might get out of the market later on, reducing therefore the global ability to compete of the industrial sector).

- ★ Public interventions to finance the innovation process are foreseen not only for the case of helping industries in difficult times, but also to increase the R & D activities, considering its social value (to improve the future societal prospects). National governments and the Commission itself are supporting R & D in several different sectors.

The rationality behind the two types of interventions is different and there is a danger to confuse between them.

As a matter of fact, the opportunities coming from the public R & D policy tend to be taken up more by the enterprises in better conditions (having already well staffed R & D activities) than those passing through difficult times. The reverse is true for the policy of public aids to help enterprises in maintaining adequate innovative resources, during transitory difficult periods.

The way priorities are set is different in the two cases. For public R & D policies, priorities (such as limiting the intervention to more basic and applied research, to more advanced sectors, etc...) respond to general social needs and considerations of macro-industrial and economic policies. For the intervention with public aids, the priorities are instead intrinsic to the single case considered.

It will therefore be a mistake, for instance to make reference to priorities coming from R & D public policy, and therefore to consider acceptable under the aids policy only the projects for applied research, for cases where (due to the sectorial and company peculiarities) the need is to allocate resources to projects at the development or pre-industrialization stage.

If the rational of the public intervention is that of helping companies to overcome difficult periods without jeopardizing its technological innovative capability, there should be no difference whether the aid is given to support basic or applied research projects or development and pre-industrialization projects according to the specific needs case by case.

- * Another question that might be faced is that of the case when a given company is at the same time participating in the R & D public financing policy (having responded to specific public request for proposal in given R & D fields) and also asking for public aids (because of the difficulty to provide adequate resources to its innovative effort). There might be a tendency to consider in this case the public intervention of the first type as performing the role of aid. It will be improper to do so and unjust. The company might in fact be willing to enlarge its research activity because of the opportunity given by the public request for proposal, while at the same time having serious difficulties to support an adequate innovation process activity.

3. The Italian case.

- * In Italy, as in almost all the other countries, the type of interventions to develop a public R & D policy and to aid industries innovative ability in difficult periods, developed along the course of the years. They do not therefore necessarily respond to a unique rational framework as that illustrated above.

An *"Inventory of the direct and indirect public measures for promoting industrial R & D in the member States"* has been published by the Commission in 1981.

The number of interventions by the Italian government is by far the smallest with respect of other countries. In 1981, the total legislative interventions numbered 10 in Italy, 18 in France, 26 in Germany, 23 in United Kingdom.

This already shows that the opportunities to apply for government interventions are greater in countries other than Italy. But even more important is the fact that in Italy there are practically no important indirect interventions (fiscal measures, provision of technical services from public bodies, etc ...). When dealing with specific interventions in the "aid" category, it will therefore be fair if one could weight them with respect to the global situation of public direct and indirect interventions.

The basic interventions for the Italian case, that are of relevance for the industrial R & D and for the innovation process are:

- The Progetti Finalizzati of the CNR (Nat. Res. Council);
- The Fund for Applied Research operated by IMI;
- The Innovation Fund (law 46/81);
- The Restructuring Fund (law 675/77).

The first two pertain to the class of the R & D public policy, the last one to the public aid for helping the innovative ability of sectors under difficulties and the third one responds probably to a mixture of the two policies.

- * The same company might have projects approved under each one of the four types of interventions.

To apply to the different types of interventions, the projects should differ, first of all because of the time horizon of their innovative objective, going respectively from longer term to shorter term application. To be more explicit, let us consider the case of four projects, each concerned with the objective of improving the energy economy of vehicle

- a) Progetti Finalizzati will deal with a target valid for the years 1995-2000 and very ambitious (e.g. a middle performance car able to have a fuel efficiency of 40 km/l);
- b) the Applied Research Fund might have selected a project on the development of electronic engine management, apt to use technology commercially available in the year 1990-1995;
- c) the Innovation Fund might accept projects to demonstrate on prototypes the ability to have high fuel efficiency (much higher than that obtained by extrapolating to-day value), for vehicles to be put on the market at the end of the 80's;
- d) the Restructuring Fund will help industries investing in restructuring its manufacturing technologies on the basis of, new product models to be marketed at shorter term.

R & D projects performed under a) and b) respond to objectives and priorities set explicitly by public authorities, to satisfy public needs.

The financing of such projects could not therefore be considered as an "aid" to industry, but more as a service that industry renders to society.

The Innovation Fund applies to projects coming from industrial sectors chosen by the public authorities in the interest of the society, having high potential of technological innovation to meet societal objectives, while also being in difficult transitory conditions. To this extent, the projects perform at the same time a service to society, together with helping the enterprise to maintain and develop its innovative capability unpaired by the difficult sectorial conditions.

- * The Restructuring Fund is a response of the government to the request of aids by industries, to permit them to be able to meet the challenge of short term restructuring, applying new technologies in periods where the self-financing of the enterprise will not permit to do so.