May 1973

TF AND CORPORATR PLANNING [1]

- I will try to present first of all the problem of the implementation of technological forecasting in industry, to summarise the results of our discussions and to answer the seven famous questions in the management process: ***what, why, when, how, where*** and so on.
- Going to the first question: **what is TF**? TF is mainly a tool for corporate and R & D planning in the changing environment, and should therefore be integrated with the more generally accepted procedures of market research, sales forecasts, cash flow estimates and so on; all of which contribute to the overall Planning of an organisation's activities.
- Going to the question: **why TF** in an industry?
  The need to add TF to the other tools of planning is due mainly to the increasing importance of interaction among the different systems in which the company operates like: markets, society, environment and technology. The main contributions of TF to the planning at the corporate and the operational levels are:
  - To search for, and assess long-term technological, sociological and any associated legislative trends, and to measure their importance to the company;
  - To recommend what actions might be taken to exploit or combat these trends;
  - To establish and maintain familiarity with the techniques of technological forecasting, and to make these available to all departments of the company.
- **When** should **TF** be set up in industry?
  Actually experience of technological forecasting varies considerably from company to company, but in general it is rather limited and many companies do not yet have a formalised and fully developed planning process. When such a formalised process is introduced, TF can be expected to contribute in a major fashion to the effectiveness of planning, particularly at the corporate level.
  A word of caution should be said on the danger of introducing TF too early in a company. In many cases new management methods penetrate a company's hierarchy very slowly, and many obstacles have to be overcome before they are fully accepted. It does not help if new management techniques are introduced and specialised units set up, but are then allowed to function without being really integrate into the company's main operations.
- **How** should **TF** operations be set up?
  Some firms have started by setting up a small committee with representatives from

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[1] U. L. Businaro, Report of Sub-Group B "TF and Corporate Planning" to the EIRMA Annual Conference, Copenhagen, May 1973

various departments. After the value of TF techniques has been proved by this committee's work or by the work of task forces set up to solve specific problems, a formal TF unit could then be appointed.

- **Where** should it be appointed?
  It is thought that the company research organisation may be the best place to initiate such action, starting from long range high risk activities.

- **Who** should be appointed to perform this task?
  High quality personnel are required for a TF unit. This personnel should preferably have had long experience in the company, and this is bound to raise problems. In fact secondment of such personnel from their current duties into what would probably be regarded as a speculative area, is sure to meet resistance. For this reason small and medium companies would almost certainly find it necessary to rely on consultants for at least part of their effort, until the value, of the technique is proven to the company in question.

  lf I may digress a little on the role of external consultants, one can say that their role may be first to process and circulate relevant information on specific fields of science and technology, putting into perspective their likely impact on company operations. Such services are already performed on a subscription basis by certain organisations. Secondly, to perform specialised investigation of selected topics on a single or multi-client basis or simply to give consultant services.
  Thirdly, to perform general scenario studies. Such general future studies are performed by so called "look-out" institutes which are growing in number around the world. This is for small firms. For larger firms it seems desirable that the TF team should contain some full time personnel, with experts being co-opted as is necessary to solve problems.

- **How much TF** should be done?
  The level of activity may vary from committee work in the initial phase of implementation, as already indicate, to full time teams of up to 5-7 people at least this was the impression gained from answers to the working group questionnaire.

- We should now discuss **why TF is a tool** in the company planning process?

  Forecasting should be the first stage in the planning process for new products or processes, the sequence being forecasting, planning and then decision making. The forecasting phase should deal with all the variables of interest to planning, and technology is certainly one such variable.

  It is first of all necessary to define the time-scale of forecasting, because the techniques employed and the use made of the results will vary according to this time-scale. The aims of the planning process vary at different levels of the industrial hierarchy, and therefore the associate time-scales vary accordingly.
  A simplified picture of the present state of corporate planning in industry distinguishes between "long range" and "short range" planning. "Long range" is also sometimes called strategic, or strategic and policy planning; and "short range", tactical or operational planning.
  The time span representing short range planning depends on the nature of the industrial organisations operations, and in general terms may be defined as the time required to carry new product or process from the initial decision concerning its

introduction, through the completion of the project.
Long range planning should be little influenced by the time required to implement the plans, but short range planning is very dependent on that time, and hence should be frequently revised.
Long range planning is the responsibility of top management, advised by headquarters staff. Short range planning is the responsibility of the operating departments.

- We now go a little more into the subject to see **how TF can help long range planning**.

  One can see that long range planning is concerned with the formulation of the best strategy to enable a firm to meet a changing environment so as to maximise profit potential. It is also concerned with the change in objectives (what is called policy planning more properly) and the related change in company structure to sustain long term growth.
  It might be worthwhile to remark here that in the past little attention has been paid to the possibility that a company's principle objectives might have to be modified to maintain growth, or even to survive at a constant level of activity. Changes in the economic, sociological and technological environment can have an important influence on company policy, but the extent to which this is effected by such changes is conditioned both by the nature of the company's activities and by the precision of the final policy.

  TF can play a role in long range corporate planning in the following manner: first, by predicting possible changes in the environment in which the company operates; secondly, by helping to assess the long term validity of the company objectives in the light of this changing future; thirdly, by defining systematically possible dangers and opportunities, and determining the timing and impact of these foreseeable changes on the current pattern of business; and finally, by ranking alternative strategies.

  The TF techniques which might be best used in relationship to long range planning, are those of the so called normative type. For instance, scenario writing, relevance trees and so on.

- Some remarks should be made on the limits of the application of TF techniques at company level.

  First, of all one should concede that the aim of interaction with TF at national or international level is to identify national of international scenarios with company TF activity. In fact the validity of long range scenarios tends to be strengthened by the implementation of national or international plans developed from them.

  Secondly, when considering the role of TF in strategic planning for industry, it should be kept in mind that circumstances are quite different from those in the military field where TF first came into being. In fact, in the military field the prophecies of TF tended to become self-fulfilling, but in industry where economic and social factors are all important changes tend to be more gradual.
  The fact that there may be an attitude in industry which resists the replacement of existing technologies by new developments is an important effect to be taken into consideration. This attitude to TF in a company might contribute to the modification of the company's attitude to technology and change. In fact TF can act as a kind of management information system on science and technology, and thus play an important role in reducing inertia by making evident the need for change. The issue of

another report on the state of the art can prove useful in showing the possible effects of changes in technology in fields of interest to the company.

- To deal briefly with **short range planning**.

  Short range planning involves the time from the decision to introduce product or process to the completion of the project. It therefore follows that detailed technological forecasting can be a tool in aiding decision making.
  But this implied that the forecast can be carried out before the decision to introduce the development is taken, either implicitly or explicitly. But even after the plan or project has been started, TF still can play a role, even more important in this case, by periodically up-dating the forecast to ensure continued viability of the project. This monitoring of signals from the technical environment will be of considerable value at this stage for example to discover in advance whether over supply is likely because competitors are taking similar action.

  Incidentally, benefits might well arise from up-dating a forecast during short range planning by the improvement of communications; because the TF act is improving communications between different company functions; such as marketing and R & D.

- We should now go on to examine **the role of TF in R & D planning**, which might be more appropriate for this audience.

  The R & D planning process has already been studied by another EIRMA Group. Very schematically it can be divided into 3 main steps.
  Firstly, to maintain the project proposal portfolio encompassing all topics of interest of the company.
  Secondly, to select new projects to be initiated, and from running projects the ones that should be continued.
  Thirdly, to set detailed targets and make detailed plans for the selected projects.

  TF has a role to play in all these steps.

  TF should be an important technique guiding research planning: trend extrapolation and expert opinion are two commonly used methods. However, since future events are largely determined by activities of other industrial companies, as already remarked, this fact should be taken into consideration.

  The role of TF could be to identify areas of interest to the company, generate new proposals, evaluate and select projects, and help in operational planning of selected projects.

  Now concerning identification of R & D areas of interest to the company it must be appreciated that one is thinking very much into the future. Current areas are obviously known, and normally those for the next five years or so must be quite firm.
  TF can help in confirming, or otherwise, that the present interest will still be relevant inside 5 to 15 years, and in identifying new areas of interest for the company, for instance for diversification.

  Among the TF techniques useful one can consider scenario writing, product technology, discipline matrix, and so on.

  Concerning the generation of new R & D proposals, one important function of the R & D planning process is to stimulate the technical sector of the company to submit

R & D proposals. The following TF procedure can be helpful in this respect: collection and circulation of information on technological trends, systematic transfer of technology between different fields, systematic evaluation of possible developments by Delphi analysis, and so on.

I want to stress these points here. I think that usually when one speaks of planning R & D, one has in mind, or speaks mostly of choosing among proposals. I think a very important function is also to promote ideas and in this respect, technological forecasting might help very much.

In project selection TF can provide a tool to aid management decisions. Techniques like product technology, discipline matrix, cost benefit analysis, trend extrapolation and so on can be helpful. Trend extrapolation can also be used to set a specific target in the case of a selected project.

- Now, just a few words on the importance of the **interaction between TF at government and at company level.**

  This importance was recognised by the group but we did not have enough time to go deeply into the problem so my remarks will be very brief.

  It should be noted that the motivation for medium and long term innovation at government level is different from that of industry, and might have a strong influence on industrial R & D strategies.
  Typical government objectives are, for example, long range equilibrium of the trade balance, competitiveness of the long range international economy and growth of national income and welfare.

  It should be emphasised here that in the future TF at government level might have even more importance than has been realised up to now. There is a change in the way in which governments are determining their research policy.
  I think it is apparent, at least at the level of discussion, that research policy is changing from what has been in the past mainly support of specified technologies, like for instance computers, aircraft, nuclear energy, and so on, to a concern for the solution of social problems. Now when you set a target like a clean environment, you are not concerned with a specific technology, but you have many alternative technologies and you should sell the case for your own technology against other possibilities. In this case TF is a very important tool.
  In the future, governments will not necessarily define the technologies they want to support and this is, I think, illustrated by the fact that in addition to TF we are now hearing of TE which means Technological Evaluation, and TA. which means Technological Assessment.

  So I think that in the future we may need two more groups, TE and TA.

- Technological forecasting has been recognised for some years, for instance by the Commission of the European Economic Community, as a means of promoting industrial innovation, and a department of the Commission has been working on several projects in the field of technological forecasting.
  According to the needs of the different sectorial policies, the Commission envisages carrying cut studies either, in its own departments or by contact, with the objective of facilitating the development of an overall industrial policy and the choice of national

and community level schemes in the different sectors. In the framework of European scientific and technical cooperation two prospective studies have already been launched in the field of transport and telecommunications, involving both the economic and technological aspects of these problems.
The aim of the European Community TF efforts is also to assist manufacturers in the decision making process by improving their knowledge of technological change and of the industrial consequences of such changes.

In this respect the Commission will first concern itself with the small and medium size firms which might be expected to be unable to deal thoroughly with the problem. With the object of discovering what type of aid could be given to these firms, two specialised institutes were asked to carry out a survey. This revealed that TF was of little use, mainly because lack of information led to insufficient accuracy in results; methods were unsuited to the firms' specialised requirements, and costs were too high. In some cases, small and medium size firms even seemed to find difficulty in solving their problems of technical information. The Commission is at present considering what kind of conclusions should be drawn from these results.

- In Great Britain, a team of interdisciplinary professional staff form a group known as the Programmes Analysis Unit which is situated at Didcot, in Berkshire. This is a government body with government departments as the only sponsors. It has the following terms of reference: to examine and develop techniques for evaluation of R & D programmes; to apply these techniques to specific programmes as required by the sponsor; to pass on the techniques to the appropriate government department when proven.

- In France, long term studies have been performed by the “1985 group” as a framework for the 5th national plan. For the 6th national plan more specific structures for analytic study have been set up such as “the central group of prospective”, “the group for sectorial prospective” (transportation, industry, communications, and so on), “the group for geographical prospective”.

  TF is also employed very much in France and also in other European countries, in the defence field.

- In Norway, in 1970, the Minister of Finance undertook a scenario on the development of society over the next 20 years. This analysis was a very sketchy type and probably no formal use was made of TF other than trend extrapolation. It is probable that this exercise will develop further however, and then a new scenario will be made every four years. Still in Norway, the Central Research Council has also tried to use technical forecasting. The Research Council is the Agency through which the government supports financially research in industry. The first stage in this effort was to divide industry and society into roughly 20 areas of activity. Within each of these areas work has been carried out to highlight the expected trends of evolution, and in this case also further work has to be done. They are aiming to use this study, as a guide for distributing funds for the support of research.